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Railway Age

AND RAILWAY REVIEW

DAILY EDITION

FIRST HALF OF 1928, No. 25D — NEW YORK—WEDNESDAY, JUNE 27, 1928—ATLANTIC CITY — SEVENTY-THIRD YEAR

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Volume 84 Number 25D

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Power Brake Tests Progressing

COMMENDATION only can be accorded the common-sense and workable manner in which the power-brake rack tests at Purdue University are being conducted under the general supervision of the Mechanical Division Committee on Safety Appliances, and directly in charge of H. A. Johnson, director of research. The experience and practical knowledge of those who have made the operation of power brake systems a life study, have been utilized, not only in setting up the preliminary schedule of tests, but, subsequently, in carrying out of these tests. It has also been realized that, while the modern power-brake test laboratory at Purdue offers an unparalleled opportunity to study the fundamentals of brake action as well as many conditions of service, other service conditions cannot be duplicated in the laboratory, and service tests of those equipments showing promise must be made before final conclusions can be reached. This fact is clearly brought out in the following quotation from Mr. Johnson's report: "Upon completion of the rack tests and the thorough analyzation of their results, road tests will be conducted with such equipments as have shown sufficient merit during the progress of the rack tests. A tentative schedule of road tests is being drafted and, upon completion, will be submitted to all interested parties, including the Bureau of Safety of the Interstate Commerce Commission, the manufacturers, the Committee on Safety Appliances and the Committee on Brakes and Brake Equipment, for their criticisms and suggestions." It is evidently the intention to utilize to the fullest practicable extent all sources of useful information and experience in the further conduct of the power brake tests, in order that wasteful moves may be avoided and sound conclusions reached without unnecessary delay.

A Pleasing Arrangement

IT is a happy arrangement which brings together at Atlantic City, through the overlap of dates, the ninth annual convention of the Mechanical Division, A. R. A., and the thirty-first annual convention of the American Society for Testing Materials. The latter group is now holding its five-day convention at Chalfonte-Haddon Hall. With the one group, the outstanding railway organization in the country dealing with railway equipment, engineering problems and maintenance and the other, the outstanding technical group in the country interested in the fundamental make-up and testing of all classes of engineering materials, the overlap of meetings occasions the bringing together of an unusual array of engineering talent. It is a situation which should be highly pleasing to both organizations, for with headquarters less than a mile apart, it not only fosters closer relationship between the two organizations, but affords the railroad men in both organizations a fine opportunity, in part at least, to enjoy in each convention any special features in which they may be specially interested.

Motor Coaches to Attract Patronage

AN examination of the motor coaches included in the exhibits in Marine Hall reveals three interesting and highly important trends in design; first, increased comfort for the passengers; second, more attractive interior and exterior appearance of the coaches; and, third, changes in design to increase safety to the passengers, equipment and pedestrians. The major portion of the motor coach routs operated by the railways cover distances ranging up to 300 miles. The reaction of the traveling public to long trips in motor coaches has been more or less unfavorable. For a while it was quite common to hear passengers who had made long trips in a coach remark that they would not make another trip, owing to the discomforts they had to endure. The coach manufacturers have recognized this unfavorable reaction and have designed coaches that, in many cases, are more comfortable and pleasing in appearance than many steam passenger coaches. Comfortable seats have been provided and so arranged that a limited number of the passengers can enjoy a view similar to that from the rear end of an observation car. Interior decorations have been worked out to please the most discriminating taste. The lighting arrangement has been improved, so that the passengers can read with ease. Through the medium of shock insulators, body vibrations have been reduced to a minimum. Arrangements have been provided so that the luggage can be stored inside of the coach, over the passenger's seat. The passenger is thus able to watch his baggage and know it is out of danger from the elements and from being taken by mistake by a passenger when leaving the coach, which sometimes occurs

when the baggage is placed on the coach roof. Other minor changes in design could be enumerated, all of which would further substantiate the statement that the manufacturers are fully co-operating with the railroads to furnish motor coaches that will further stimulate the interest of the public in riding long distances, thus aiding the railroads to regain and hold the passenger traffic they have been losing.

Co-Operative Relations with the Universities

THE two reports read Monday by H. A. Johnson and W. E. Gray, and also the paper read last week, Thursday by Dean Potter, all of Purdue University, have aroused some comment as to why the Mechanical Division has not done more towards utilizing the laboratory facilities and engineering talent of the various technical institutions throughout the country. One suggestion has been that, instead of assigning all the research and experimental work to a single institution, this work be apportioned among institutions located in different parts of the country so that more of the right kind of engineering students might be attracted to railroad work. Considering only the research and experimental work, the Mechanical Division would benefit by such a policy because of the greater variety of special knowledge placed at its disposal.

The American Society of Mechanical Engineers' Railroad Division Sub-committee on Professional Service, received a large number of very discouraging reports from the mechanical engineering heads of universities and deans of engineering schools throughout the country relative to the prospects for technical graduates in railroad work. One university of high standing abandoned its course in railway mechanical engineering in 1926 and a second institution has been seriously considering the advisability of doing likewise.

Since 1924 the American Railway Engineering Association has had a Committee on Co-operative Relations with Universities, some of the objects of which are to bring to the universities the results of the deliberations of the American Railway Engineering Association where such can be of value to them; the stimulating of greater interest in the science of transportation among engineering students who may be inclined toward that branch of railroad work, and to serve as a means whereby the facilities of the universities may be made more directly available for the research work of the association by co-operative effort between their laboratories and the committees of the association.

Whether or not the Mechanical Division is warranted in creating a committee, similar in scope and objective to that of the A. R. E. A. Committee on Co-operative Relations with the Universities, is an open question. The fact that it is already co-operating satisfactorily with Purdue through its General Committee and several of its working committees, suggests that co-operation with other technical schools can be established through existing agencies, and there may be little need for organizing another committee for such work.

The Mechanical Division is the official organization for mechanical department matters for the railroads in all sections of North America. Its decisions affect the inhabitants of every county and state in the Union and every province in Canada where railroads run. The Mechanical Division does not confine all of its work requiring operating tests to one railroad. It utilizes the facilities of railroads in various parts of the country, and for very good reasons. Why not also utilize the laboratory facilities and talent of technical schools in different sections of the United States and Canada?

The Wheel and Axle Manual

THE Mechanical Division is to be congratulated on the success of its Wheel Committee under the leadership of Chairman C. T. Ripley, chief mechanical engineer of the Santa Fe, in completing the revision of the Wheel and Axle Manual and submitting it for adoption this year as recommended practice. Relatively few outside of the Wheel Committee itself probably realize the amount of effort involved in the preparation of this 187-page manual which represents one of the most constructive pieces of work turned out by a Mechanical Division committee in recent years.

Wheel and axle work constitutes a highly important and costly item of mechanical maintenance, as will be realized from the fact that a single road owning about 80,000 cars is said to spend over two million dollars a year on wheels and labor related to them. The function of the manual of minimizing this expenditure and promoting safe operation cannot be better expressed than in one of the introductory paragraphs:

"From the cost viewpoint alone, the importance of wheel and axle work is such that special effort to establish and maintain the best practices is justified. A still more important element is that of safety. Wheel and axle failures not only cause a large loss in property, but may endanger human life as well. Under these circumstances, it is imperative that the railroads, private car lines and all outside shops use every effort to supervise their shop practices in such a way as to produce the best results."

The recommendation of the committee that on each road a staff officer or committee be assigned to give special attention to wheel and axle work deserves serious consideration in order that the most wide-spread dissemination of the manual's contents may be secured to all wheel shop men, and wheel and axle inspection forces. With the more or less constant change and improvement in wheel shop work, no manual of recommended practice can be a closed book, and the Wheel Committee particularly emphasizes its desire to receive suggestions for further necessary revisions. The general observance of fundamentals outlined in the present manual, however, will go far to effect highly desirable improvements in present practice.

The Work of the Arbitration Committee

ON Tuesday, the Arbitration Committee presented, as usual, a very complete report setting forth the revisions of the rules to meet the new conditions set up by the reports submitted by other committees of the Mechanical Division better to meet operating conditions. During the past year the committee handled less than the usual number of arbitration cases, which can be interpreted as a healthy sign that the members of the association are getting a better understanding of the rules and are perhaps

becoming a bit more reasonable in applying them, thus eliminating many unprofitable and unnecessary controversies.

The changes recommended by the committee were almost all connected with the recommendations made by other committees, notably the recommendations from the General Committee, the Safety Appliance Committee, the Car Construction Committee and the Committee on Wheels and Axles. To understand intelligently the changes recommended by the Committee, the reports presented by the above-mentioned committees should be carefully studied. New Rules 26, 35 and 112 are proposed. Rule 26, which covers the application and repair of arch bars, was presented for the purpose of interpolating in the interchange rules the proposals of the report of the Committee on Car Construction. The introduction of Rule 35, which deals with the enclosure of hopper doors on gondola cars in interchange, was made at the request of the Transportation Division for the furtherance of safety.

The proposed changes in the Rules from 68 to 98 almost entirely deal with the recommendations made by the Wheel Committee, and were made to harmonize the requirements in the Wheel Manual. New Rule 112 was brought about by the action of the Interstate Commerce Commission in connection with the settlement for rebuilt cars. The changes to the passenger car rules were made to agree with the recommendations of the Wheel Committee.

The Report on Loading Rules

THE report of the Committee on Loading Rules developed a heavy discussion, in which not only the members but a number of shippers took part. The suggestion made last year by J. J. Tatum that the loading rules be revised and each rule be printed separately was turned down by the committee for the principal reason that the size of such a book would be too cumbersome for an inspector to carry in his pocket. It is recognized that voluminous instructions, as compared with those in condensed form, are not convenient for reference by those who have to use them. The loading rules are a part of the rules of interchange, and it is essential that they be as concise and easily understood as it is possible to make them. All of the speakers, both members and shippers, complimented the committee on the work it was doing, and expressed the opinion that the rules were serving their purpose quite efficiently in their present form.

A suggestion, however, may be offered which can be made a big help to some inspectors in checking up on the loading of specific classes of materials, especially at points where the loading is largely confined to a considerable amount of one commodity, such as machinery, or sheet steel or pipe. Practically all railroads have stations on their lines where the shipping industries load only one class of commodity. Inspectors at such points are primarily concerned with the loading of that commodity. Each railroad may provide the shippers and its own inspectors at such points with small books containing only the rules and drawings pertaining to the loading of the class of commodity. Inspectors at such points are pri- example, if an inspector is located at some point from which the only commodity shipped is machinery, he will be provided with a book containing only the rules for loading machinery and such general rules as are needed. Such books may either be made up of photostat copies of pages from the A. R. A. loading rules, blue print sheets prepared in the drawing room, or mimeographed pages with blue prints or photostats of the drawings. They should eliminate the necessity of inspectors having to leaf through a lot of material with which they are not concerned, and can be provided on a practicable basis by each railroad to suit its own special conditions for the relatively small number of cases where but one class of material is handled in large quantities.

Today's Program

THE final session of the ninth annual meeting of the Mechanical Division of the American Railway Association will be called to order in the Greek Temple on the Million Dollar Pier at 9:30 A. M. Daylight Saving Time. The program follows:

Discussion of Reports on:
- Wheels.
- Car Construction.
- Lubrication for Cars.

Election of Officers and Members of General Committee.

A. S. T. M. Opens Convention at Chalfonte-Haddon Hall

THE first general sessions of the thirty-first annual convention of the American Society for Testing Materials were held yesterday at the Chalfonte-Haddon Hall, Atlantic City, following a busy day of preliminary committee meetings. At an early session announcement was made of the following newly elected officers of the society for the year 1928-1929: President, G. W. Thompson, director of the National Lead Company, and, vice-president, K. G. Mackenzie, consulting chemist of the Texas Company. The newly elected members of the Executive Committee are Prof. T. R. Lawson, head of the Department of Civil Engineering, Rensselaer Polytechnic Institute; H. S. Mattimore, engineer of materials, Pennsylvania State Highway Department; P. D. Merica, director of research, International Nickel Company, and Samuel T. Wagner, consulting engineer, Reading Company.

About one hundred papers and reports, a number of which will be of specific interest to railroad men, will be presented at the meetings of the society which will be held morning, noon and evening each day this week until Friday night. Following is the convention program in brief for the remainder of the week:

Wednesday (Today)

Fifth session, 9:30 a. m.—Reports on steel and magnetic testing.
Sixth session, 9:30 a. m.—Petroleum products, electrical insulating materials and preservative coatings.
Seventh session, 4 p. m.—Edgar Marburg lecture and award of Charles B. Dudley medal.
Eighth session, 8 p. m.—President's address and report of Executive Committee.

Thursday

Ninth session, 9:30 a. m.—Metals, corrosion, fatigue and properties at elevated temperatures.
Tenth session, 8 p. m.—Non-ferrous metals and metallography.
Eleventh session, 8 p. m.—Nomenclature, waterproofing, road materials and aggregates.

Friday

Twelfth session, 9:30 a. m.—Brick, tile, refractories, slate and stone.
Thirteenth session, 9:30 a. m.—Cement, lime, gypsum and drainage pipe.
Fourteenth session, 8 p. m.—Concrete.

Exhibit Closes at 12.30 P. M.

IT is expected that the Mechanical Division will adjourn at 12 noon today. The Executive Committee of the R. S. M. A. has ordered that the exhibits remain open until 12.30 P. M. Exhibitors are requested to refrain from starting their dismantling and packing operation until that hour.

Mrs. R. W. Retterer Dies

AN event which has saddened many convention visitors is the death of Mrs. R. W. Retterer, wife of the mechanical engineer of the Big Four at Indianapolis. Mrs. Retterer was taken very ill at the Marlborough-Blenheim Hotel on Sunday. The physicians called in to attend her decided she must have an operation and she was on her way to a hospital in Philadelphia on Monday when she suddenly died on the train between North Philadelphia and the Broad Street Station. The body is being taken to her home in Indianapolis for burial.

Stop Off at Baldwin

TWO years ago we suggested at the close of the convention that the members take the opportunity to stop off and visit the Sesqui-Centennial International Exposition at Philadelphia. This year there occurs in Philadelphia, the day after the close of the convention, an event of special interest to railway men. The Baldwin Locomotive Works is to celebrate the transfer of the plant from Philadelphia to Eddystone. The program will start at 11.30 a. m., daylight saving time, and a special train will leave the Pennsylvania station in Atlantic City at 9.30 a. m., daylight saving time, going direct to Baldwin, Pa. The plant is located on the Maryland division of the Pennsylvania Railroad, 12 miles from the Broad Street station, Philadelphia.

A cordial invitation is extended to all those visiting the convention, including the ladies, to make this trip on the special train as guests of the Baldwin Locomotive Works. Please leave your name at the Baldwin booth.

President Vauclain will be in charge of the ceremony, and the speakers will include Secretary of Labor Davis, and the Honorable Alfred Dutton MacDade, judge of the Delaware County Courts. Ample opportunity will be given for the inspection of the plant and of the new administration building, which is said to be one of the finest office buildings in this country.

Lost and Found

LOST—Badge No. 5412. If found return to Registration Booth.

LOST—Diamond bar pin. If found return to office of secretary.

LOST—Two cameras. If found return to office of secretary.

LOST—Black cloth embroidered hand bag, containing Marlborough Hotel key, room No. 150., Saturday, June 23. If found return to office of secretary.

LOST—Blank note book. If found return to office of secretary.

FOUND—Diamond pin. Call at office of secretary.

Expression of Appreciations from Messrs. Bean and Phelps

THE latest reports from the Atlantic City Hospital are that Will Bean is resting very comfortably. It now appears that in addition to her other injuries, his mother suffered a slight fracture of a knee cap, and the X-rays indicate that the injury to Mr. Phelps' ankle is somewhat more serious than at first appeared. The patients, as well as Mr. Bean's wife, have been deluged with expressions of regard and sympathy.

The *Daily* has just received the following letter from Mr. Bean:

"Everybody has been so very kind and helpful to Mother, Mrs. Bean and myself in our misfortune that we wish to express, if practicable, through the columns

Some of the Members of the Entertainment Committee, Including the Chairman, J. W. Fogg, and the Vice-Chairman, Charles J. Nieman

of the *Daily Railway Age*, our very deep appreciation. We regret exceedingly the anxiety caused.

"The flowers and other tokens are fine; the outpouring of most friendly and helpful sympathy, extraordinary. Mr. Phelps joins with me in this expression.

"Apparently Mother, Mr. Phelps and I are making rapid recovery. With much appreciation, I am,

Yours very cordially,
W. L. Bean."

Registration Figures

THE total registration at 3.30 p. m. yesterday (Tuesday) was only 53 behind the 1926 figure. Never before have there been so many railroad men and railroad ladies in attendance.

	1920	1922	1924	1926	1928
Mechanical, Division V	875	999	1207	1410	1525
Purchases and Stores, Division VI	364	376	427	480	493
Motor Transport, Division VIII					56
Railroad guests					688
Railroad ladies	798	1008	1178	1191	1316
Supply men	2575	2290	2666	3122	2644
Supply ladies	676	573	675	725	751
Special guests	785	907	1066	875	38
Complimentary					239
Total	6073	6153	7219	7803	7750

R. S. M. A. Committee Appointments

PRESIDENT-ELECT, Gilbert E. Ryder, of the Railway Supply Men's Association, has thus far made the following appointments for his term of office:

F. E. Dodson, United States Rubber Company, Baltimore, Md., who this year has acted as vice-chairman of the Enrollment Committee, has been appointed to the chairmanship of that committee.

Ralph Brown, Adams & Westlake Company, Chicago, who this year functioned as vice-chairman of the Transportation Committee, has been promoted to the chairmanship.

The Entertainment Features

THE entertainment yesterday, including the Grand Ball last night, kept pace with the high standards which have been set by the Entertainment Committee in its efforts this year to vary the program and, if possible, make it more effective. J. W. Fogg, chairman, and Charles J. Nieman, vice-chairman, backed up by their associates, have made an enviable record.

One feature, which was quite noticeable this year, was the splendid use made of what might be termed "our own talent." The Reading Seashore Band, under the direction of John L. Snyder, has functioned on several occasions. The Pennsylvania Red Arrow Quartette gave an excellent account of itself. Miss Viola Smart, who featured "Miss Canada" on Saturday evening, and A. McGowan of the Canadian National Railway, made most delightful contributions on "Canadian Night." It was a real treat also to have Mrs. Edward Laterman sing at the Sacred Concert on Sunday afternoon. For years, as Miss Mary Currie, she accompanied her father, the late James C. Currie of the Nathan Manufacturing Company to the conventions, and was almost invariably on the program at Saratoga.

Howard J. Melaney, the tenor soloist from the Northern Pacific, again sang for us yesterday afternoon and evening. Mr. Melaney has the reputation of having developed as a singer in an extraordinarily short time—less than two years in fact. He spent his early life in Wisconsin and in 1910 moved with his family to Glendive, Mont., where they had staked a claim. It developed, however, that he was not intended for the farming business and he managed to get a job on the Northern Pacific, firing out of Glendive.

When stokers were introduced, Mr. Melaney realized that they were going to make his job easier and he made a particular effort to favor and get the most out of them. This attracted the attention of his superior officers and on one occasion he was called to Minneapolis for a conference with representatives of another road which was planning on introducing stokers. Quite accidentally he came in contact with the operator of the broadcasting station in the Hotel Nicolet in Minneapolis. In talking over the broadcasting problem he was asked if he played an instrument. He replied, "No," but that

The Members of Transportation Committee: George R. Boyce, Chairman, and Ralph Brown, Vice-Chairman

he did sing a little. As a result he was asked if he would like to enjoy the sensation of singing a piece at a radio concert that afternoon. His performance made so great an impression that on the same evening, when one of the singers that had been announced failed to appear, he was asked to take his place. He received much favorable notice, both from radio fans and in the press, and thereafter, upon his return to Glendive, was asked more or less regularly to sing at broadcasting stations.

Madame Schumann-Heink, hearing of him on one of her trips to Montana, asked him to sing in a prelude to one of her concerts and made certain suggestions for following up his studies. To make a long story short, Mr. Melaney has since sung at 55 broadcasting stations from WJZ in New York to KFI in Los Angeles, and has a national reputation because of his ability as a tenor soloist. He is now connected with the traffic department of the Northern Pacific and is in great demand. He came all the way from Seattle, Wash., to Atlantic City to favor us; Mrs. Melaney is with him.

It was these numbers, given by the very best talent and yet of our own group, that helped to introduce a friendly atmosphere to this year's entertainment that it would be hard to beat.

The Grand March at the ball last night was led by President Smart, of the Mechanical Division, and his daughter, Miss Viola, accompanied by the chairman of the Entertainment Committee, J. W. Fogg; and by President Bateman of the Railway Supply Manufacturers' Association, and his wife, accompanied by the vice-chairman of the Entertainment Committee, Charles J. Nieman. The McKay Herald Trumpeters of Philadelphia preceded the march and gave it a most effective setting.

The sub-committee in charge of the Grand Ball included C. R. Naylor, chairman; L. J. McCombs, vice-chairman; L. B. Rhodes, S. L. Bateman, G. W. Denyven, A. G. Johnson, S. B. Wight, Jr., A. E. Biddle, F. W. Venton, W. B. Keys, C. L. Mellor, C. L. Brown, F. E. Symons, J. L. Rowe, E. E. Thulin, Bard Browne, and C. W. F. Coffin, master of ceremony

Performance of Texas Type Locomotives

THE Texas type locomotive of the Texas Pacific, which was referred to briefly in the description of the locomotives included in the track exhibit in the *Daily* of June 20, is similar, with slight modifications, to the first lot of these locomotives delivered in November, 1925. Since the former article was published data pertaining to the service of these locomotives has become available, which shows that they have given a splendid account of themselves both as efficient operating units and as to maintenance costs.

It will be remembered that these locomotives operate with a limited cut-off of 60 per cent with tandem type main rods which divide the load on the main pin between the No. 3 and No. 4 driving wheel crank pins (the total piston thrust is 168,500 lb.); that they have 29-in. x 32-in. cylinders, carry 255 lb. boiler pressure and develop a maximum tractive force of 84,600 lb., which is increased to 97,900 lb. by the limited cut-off trailer booster. The trailer is of the four-wheel articulated type.

The fact that some of these locomotives have been in service since late in 1925 has afforded a splendid opportunity for a comparison of the locomotive of this general design with the Santa Fe type locomotives formerly in general use in the same service now being performed with the newer locomotives. In the case of the Santa Fe type locomotives, which are of conventional design, the life of a set of rod bushings averages about 15,000 miles, whereas the set of rod bushings on the Texas type locomotives have been found to last approximately 25,000 miles. This feature alone has effected marked savings in running repairs and has also increased the opportunity to keep this power in operation for a much longer period before taking it out of serivce for the purpose of making repairs.

The average cost per mile for running repairs of the Texas type locomotives runs about 20 cents per mile with about 50 per cent of their assigned mileage run out, whereas the cost of running repairs of the Santa Fe type locomotives with the same percentage of the mileage run out averages about twenty-seven cents per mile.

In fuel consumption Texas type locomotives have also shown marked economy. The gallons of oil per 1,000 gross ton miles consumed by these engines has remained 41 per cent less than that of Santa Fe type locomotives consistently every month since the engines were placed in service in 1925.

Running tests were made with these locomotives at speeds of 45 miles an hour, taking stremmatagraph readings to determine the strain in the rail under each wheel of the locomotive on straight, level track. These tests showed the weights on each driver, on the engine truck wheels and on the wheels of the four-wheel trailing truck to be properly distributed and that they produce minimum stresses in the rail for a locomotive of similar weight. The average driving-axle load is 60,600 lb. on the rail, while the rear wheels of the trailer carry 54,000 lb.

Texas Type Locomotive in the Track Exhibit

Registration American Railway Association

Division V—Mechanical

Aberle, C., Gen. For., C. of N. J., Mt. Vernon
Amorosa, L., Asst. Piece Wk. Insp., C. of N. J., Doyle Cottage
Anderson, A. L., Gen. For., L. I., Brighton
Armstrong, J. E., Asst. Ch. Eng., C. P. R., Strand
Baldwin, Hadley, Ch. Eng., C. C. C. & St. L., Traymore
Barry, J. J., Asst. to S. M. P., N. & W., Ritz
Beaghen, Tom, Jr., M. C. B., Mex. Pet., Traymore
Blades, Ezekiel P., Car Insp. M. P. & R. E., A. C.
Bond, F. L. C., Gen. Supt., C. N. R., Strand
Boughton, N. J., Eng. Tests, M. H. T., New Belmont
Boumley, D. J., Ch. Eng., I. C., Strand
Boyer, Wm. E., Draft., Reading
Brenaman, H. A., Asst. Wks. Mgr., Penna., Strand
Brown, Edward L., Gen. Car For., B. & O.
Bullock, R. D., M. M., A. C. L.
Butler, Elbert, Car Insp. M. P. & R. S., Atl. City, Emerson House
Byron, A. W., M. M., Penna., Marlborough
Carr, R. K., Ch. Cl. to S. M. P., N. & W., Ritz
Childs, H. E., Asst. M. M., B. & O.
Clegg, Wm. H., Ch. A. B. Insp., Can. Nat., Dennis
Clouser, Harry C., Asst. For. Mp. & R. E. Dept., Reading
Cole, T. E., A. B. Inst., C. R. R. of N. J., Osborne
Cook, Bernard, G. F., N. & W., Ambassador
Cooper, W. E., Insp. Bur. Explo., A. R. A., Traymore
Corr, W. E., Asst. Gen. Car For., S. A. L., Princess
Corsi, A. J., R. F. E., B. & O.
Corson, G. S., M. M., N. Y. C., Louvan
Cromwell, E. G., Spe. Insp., B. & O., Haddon Hall
Cuddy, James, Trainman, L. I., Conway
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Doub, C. L., Asst. Eng., Reading
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Erickson, C., Gen. For., C. of N. J., Mt. Vernon
Fritch, E. H., Sec. Eng. Div., A. R. A., Strand
Geiser, W. P., Ch. Chem. M. P. & R. S. Dept., N. Y. C., Ambassador
Gibbony, Jas. H., Ch. Chem., N. & W., Ritz
Glase, Jas. E., Car Insp., M. P. & R. E., A. C.
Goll, Daniel D., For. Black., Reading
Gorman, Edw. P., Res. Eng., Reading, Marlborough
Graff, R. H., Asst. Eng. M. P. & R. S., N. Y. C., Jefferson
Gray, C. B., M. M., Penna.
Grimshow, F. G., Wks. Mgr., Penna.
Hamre, J. R., Test Dept., N. Y. N. H. & H.
Harlan, Geo. S., Gen. Fr. Agt., B. & O.
Hatch, V. F., Gen. For., Penna., Elberon
Henry, C. L., Asst. M. M., Penna.
Heskett, J. J., Gen. For., B. & O., Glaslyn Chatham
Heskett, J. Z., Insp. Mot. Pow., B. & O., Glaslyn Chatham
Higgs, Geo., R. F. E., C. R. R. of N. J.
Hill, Howard, Asst. For., Reading, Stevenson House
Hill, J. B., Pres. N. C. & St. L., Marlborough
Hipkins, C. C., R. F. E., Penna.
Hoffanmann, K. E., Asst. Eng. Test, Penna., DeVille
Holt, L. J., Gen. Boiler For., N. P. Belt Line
Hood, J. M., Gen. Supt., A. C. & Y., Marlborough
Horine, J. W., Foreman, Penna.
Hortor, F. J., Eng. Roll Stk., N. Y. C. & St. L., Ritz
Johnson, C. C., For. Car Insp., W. J. & S., Madison Ave.
Kissinger, F. H., Gen. Boiler Insp., Reading
Kotalic, A., For. M. Dept., C. of N. J., Doyle Cottage
Lambert, W. P., Spec. Asst., C. of N. J., Craig Hall
Leppington, W., For., C. of N. J., New Brady
Lewis, H. L., Gen. For. Car Rep., R. F. & P.
MacKinnon, J. J., Car For., Gulf Ref., Colton Manor
McDermott, T., Asst. Mech. Eng., D. L. & W.
McLain, Leland J., Trav. Car Insp., D. & H., Richmond
Mader, G. C., Gen. For., Penna.
Martin, C. B., Trans. Eng., N. Y. C., Haddon Hall
Mattheus, Wm. G., Asst. For., N. Y. C., Louvan
Maxfield, H. H., S. M. P., Penna.
Meckstroth, E. H., Gen. Car For., B. & O., Lexington
Mewshaw, T. E., M. M., B. & O., Jefferson
Mills, D. L., Asst. M. E., C. & N. W., Knickerbocker
Moll, Geo., R. F. E., Reading, Stanley
Nix, E. A., For. Frt. Car Insp., C. R. R. of N. J.
Norton, Arthur W., Val. Mech. Eng., B. & O., Arlington
Nowell, H. T., Mech. Supt., Cen. Verm., Haddon Hall
Parker, E. R., Gen. For., N. P. Belt Line
Parker, H. H., Jr., Mech. Eng., N. P. Belt Line
Peck, W. F., Supv. of A. B., B. & O., Ritz
Peters, W., For., C. of N. J., Jefferson
Phillips, C. F., Trav. Insp., N. Y. C.
Phillips, Gordon R., Sup. Car Dept., Reading
Porterfield, W. B., M. M., B. & O., Traymore
Powers, T. F., Asst. S. M. P. & M., C. & N. W.
Pratt, I. D., Gen. For., P. R. R.
Reynolds, C., Gen. For., C. of N. J., Jefferson
Rider, H. C., For. Mat. Insp., N. Y. C.
Rogers, E. I., Ch. Eng., P. & P. U., Strand
Rossiter, C. A., Gen. Car For., Wash. Term.
Rousch, C. S., Asst. M. M., Penna., Dennis
Schaeffer, R. E., Sec. Gen. Supt. Car Dept., B. & O., Haddon Hall
Schiffgen, J. A., G. F., B. & O., Ritz
Shank, Edw L., Asst. For. M. P. & R. E. Dept., Reading
Sindall, G. E. M., Asst. Gen. For., Penna., Westminster
Snare, G. E., For., Penna., Knickerbocker
Squire, G. H., Engr., C. of N. J., Osborne
Stanton, Edward, Ch. Car Insp., N. P. & B. L., Osborne
Steelsmith, Paul W., Test Dept. Asst., A. T. & S. F.
Sumner, A. W., Gen. For., Penna.
Titus, B. F., Asst. End Train Cont., N. Y. C.
Wagner, A. W., Gen. For., Wabash
Weber, Walter W., Asst. For. M. P. Dept., Reading
Welker, Harvey S., Fireman Inst., Reading
Wieand, C. L., Mech. Sup., Reading
Willoughby, Victor, Gen. Mech. Eng., A. C. & F., Ritz
Withington, Sidney, Elec. Eng., N. Y., N. H. & H.
Wyrough, H. M., Asst. M. M., Penna.
Yates, H. Q., For., Penna.
Young, Geo. L., Blrmkr., Reading, St. Charles
Young, W. H., For., Penna., Lafayette

Division VI—Purchases and Stores

Bowers, Samuel D., Ch. Cl. Pur. Dept., B. & O., Strand
Kinnear, C. W., Asst. G. S., Penna., Traymore

Special Guests

J. H. Adams, Asst. T. M., Reading
Harold C. Atkinson, Val. Insp., Reading
John B. Austin, For., P. R. R., Lafayette
Franklin Balthaser, Genl. Y. M., Reading, Boscobel
J. I. Banks, Gang For., Penna., Princess
Geo. Beirne, For. Fit. Shop., C. N. J., Mt. Vernon
H. J. Bennett, Retired Gen. For., Penna.
Arthur Benton, Gen. Car Insp., P. R. R.
Oliver A. Bickel, Draft., Reading, Stanley
J. R. Boeck, Asst. For., P. R. R.
G. E. Bostwick, Train Disp., W. J. & S.
H. E. Boyer, Asst. For., Reading
E. J. Bradley, Ret'd For., P. R. R.
J. W. Bradley, Asst. For., Penna.
J. S. Brobst, Frt. Agt., Reading
L. E. Brown, Cl. Car Serv. Dept., B. & O., Shelburne
E. H. Burnhart, Indus. Eng., B. & O., Strand
I. M. Chambers, Draft. M. E., Penna., Penn Alto
Jas. A. Claflin, Adv. Mgr., Penna.
M. A. Clark, Asst. Supt., Un. Tank Car
Albert Clayton, Penna.
Burton C. Dakin, Car Shop For., N. Y. C., Eastbourne
Edgebert R. Diener, Reading, Stanley
Paul F. Early, Eng., Reading
T. Eguchi, Asst. Traf. Mgr., Japanese Gov. Rys., Chelsea
V. B. Fisher, Gen. Supt., Reading, Dennis
R. P. Fry, Cl. to G. S. M. P., Penna.
R. B. Haenchaen, Asst. For., Reading
H. F. Harriman, Vic. Chair., Bur. of Bud., Traymore
A. T. Hawk, Eng. of Bld., C. R. I. & P., Strand
A. L. Hessler, Ch. Cl. Sec., Penna.
A. L. Hiller, Clk., Reading
W. A. Hoffman, For., C. R. of N. J.
Scott W. Hoffmaster, Clk. M. P. Dept., Reading
T. W. Howell, Asst. Pass. T. M., P. R. R.
A. M. Johnsen, Eng. of Tests, Pullman, Chalfonte
R. C. Jones, Spec. Eng., N. Y. C.
Richard W. Kaucher, Ch. Draughtsman, Reading
J. Kimura, Asst. Traf. Mgr., Japanese Gov. Rys., Chelsea
J. M. Kinkead, Div. Eng., Penna., Marlborough
C. R. Knowles, Supt. Wtr. Serv., I. C., Strand
A. L. Lee, Asst. Gen. Car For., C. R. R. of N. J.
C. A. Lingenfelter, Asst. Supt., P. R. R.
A. M. Longacre, Frt. Pass. Agt., S. P., Fredonia
Thos. L. McClelland, Asst. Land Appraiser, Reading
Matthew L. McElheny, Supt., B. & O.
F. C. McReynolds, Acct., B. & O.
J. R. Mecouch, Supv. of Sta., Penna.
Samuel R. Miller, Supv., Reading
Wm. V. Moon, Asst. Sig. Engr., Reading
Frank Mooney, Engr., C. R. R. of N. J., New Brady
R. H. Nicholas, Asst. M. M., C. R. R. of N. J.
James A. O'Reilly, Insp., I. C. C.
P. Parke, Ch. Eng., Pullman, Traymore
R. P. Pfeil Fireman Instr., Reading
W. B. Porter, M. M. P. R. R.
C. P. Richardson, Eng. Track Elev., C. R. I. & P., Strand
T. E. Rohland, Penna.
Seiward, A. M., Pass. T. M., P. R. R.
Geo. C. Shugarr, Gen. Loco. Insp., Reading
H. A. Smith, Bus. Mgr. M. B. A., Penna.
G. W. Stroh, C. C. M. P. Dept., N. Y. C.
Wm. C. Swartout, Asst. Engr., Mo. Pac., Haddon Hall
John L. Temple, I. C. C.
E. C. Totten, Gen. Car For., N. Y. C., Pennhurst
A. P. Turnbull, Dist. Claim Agt., P. R. R.
J. B. Warrington, Asst. T. M., Reading
C. S. Weatherly, M. P. B., Reading
Geo. Westerfelhaus, Engmn., Reading
R. K. Wilkins, Pass. Dept., Penna.
Wm. S. Yerkes, Eng., Reading

Conventionalities

Mr. and Mrs. L. R. Richardson's daughter, Miss Mary, is a lady convention visitor who is still young enough to admit that she has had a birthday this week.

L. C. Fritch, vice-president in charge of operation of the Rock Island, spent the week-end in Atlantic City and made a thorough survey of the exhibit accompanied by other officers of that railway who are here.

Mrs. Le Grand Parish joined Le Grand at Atlantic City yesterday. After roaming around the world for eight months and poking into all sorts of odd corners, their home at Mountainview, N. J., looks mighty good to them.

Robert A. Carr, son of Walter S. Carr, who arrived yesterday morning, flew by air mail from San Francisco to Chicago and came by train the rest of the way. He is enthusiastic about his trip by air and is predicting a great future for air transportation.

Two visitors who are at the conventions for the first time are Peggy Lou and Betsy, the young daughters of Walter C. Doering. The Doering family motored from Chicago and the young ladies arrived yesterday after a short stay with friends in New York.

Probably the youngest looking man on the Pier for his age is E. B. Leigh, president of the Chicago Railway Equipment Company. Mr. Leigh's friends know that he recently celebrated his 75th birthday, but nobody who has not been so informed would ever suspect it.

The "Hunt-Spiller Boys" are here this year in new, tastily designed uniforms of a dark gray coat, light gray trousers and haberdashery to match. Since 1916 they have followed this practice of singleness of dress. Before this year, however, they wore all-white suits with gray stripes.

David Pye has been coming to the conventions unchaperoned heretofore, but he is well chaperoned this year. He is accompanied by Mrs. Pye, his daughter, Orrea, who is a student at Wellesley, and his mother-in-law, Mrs. H. A. Edgette. Their party also includes Mr. and Mrs. W. C. Pettee, the latter of whom is a sister of Mrs. Pye.

Roy C. Beaver, assistant mechanical engineer, Bessemer & Lake Erie, is here attending the convention with Mrs. Beaver. Mr. Beaver is known largely for his investigations of locomotive de-railments on curves. His writings on this subject have been published extensively in the railway press in this country and also in the government railway bulletins of Great Britain and India.

Mr. and Mrs. F. H. Clark returned from China within the last year and are attending the conventions. Mr. Clark was for some years technical advisor to the Chinese Government Railways, but it seems probable that owing to the disturbed conditions in that country he will not return there, but will conduct a consulting practice in the United States.

W. E. Woodward, vice-president of the Lima Locomotive Works., Inc., did not arrive at Atlantic City for the convention and exhibit until Tuesday morning. This is accounted for by the fact that his son George, graduated from Cornell, of which Mr. Woodard himself is an alumnus, last week. At the end of the week he saw both his son and daughter off for Europe.

M. A. Smith, superintendent motive power of the Pittsburgh & Lake Erie, was unable to get to Atlantic City this year. Friends of Mr. and Mrs. Smith, however, will be delighted to know that a recent operation on Mrs. Smith's eyes proved to be a success and she now finds that sight has been fully restored in one eye, and the probabilities are that she will regain the sight of both eyes.

W. H. (Bill) Hall, chief car inspector of the New Jersey Central, is one of the old-timers attending the convention this year. We dislike to use the word "old" when referring to Bill, for all of those who know him will tell you that he is as young today as he ever was. Bill was present at the convention at Saratoga, N. Y., in 1894, but did not get into the picture which was published in Monday's issue of the Daily.

R. C. Burns, assistant engineer of the Pennsylvania and president of the Air Brake Association in 1926, arrived at the convention Monday afternoon. His friends will be sorry to learn of the death of his mother, who passed away on June 14. Her illness prevented him from attending the convention of the Air Brake Association in May, the first meeting of that association which he has missed for many years.

W. D. Thompson, president of the Hutchins Car Roofing Company, has just returned from a flying trip to Europe. Perhaps "flying" isn't the work, because nowadays that might be taken literally. At any rate, it was rapid enough for anyone. Mr. and Mrs. Thompson sailed from here on the Berengaria May 16, to visit their daughter who has been studying abroad and to bring her back with them. The family visited Scotland and returned on the Majestic just in time for the convention.

Stanley W. Midgley, of Midgley & Borrowdale, who has attended the conventions since the days at Saratoga, came this year for the first time in an automobile all the way from Chicago with his wife and son, but not without difficulties. "Stan" evidently was afraid of being identified for his car proved to be such an efficient oil burner that he was hidden by a perpetual smoke screen. He used 16 gallons of oil during the trip, which cost him more than the gasoline. "Stan" is thinking of adding a superheater, but, with Mrs. Midgley along, he needs no booster.

The New York Central has certainly assigned some real experts in the art of answering questions, to the job of explaining the mysteries of its Hudson type locomotive to the uninitiated public. The following conversation was overheard in the cab of No. 5216:

Lady—"How does the engineer know what all those valves and doo-hinkies are used for?"

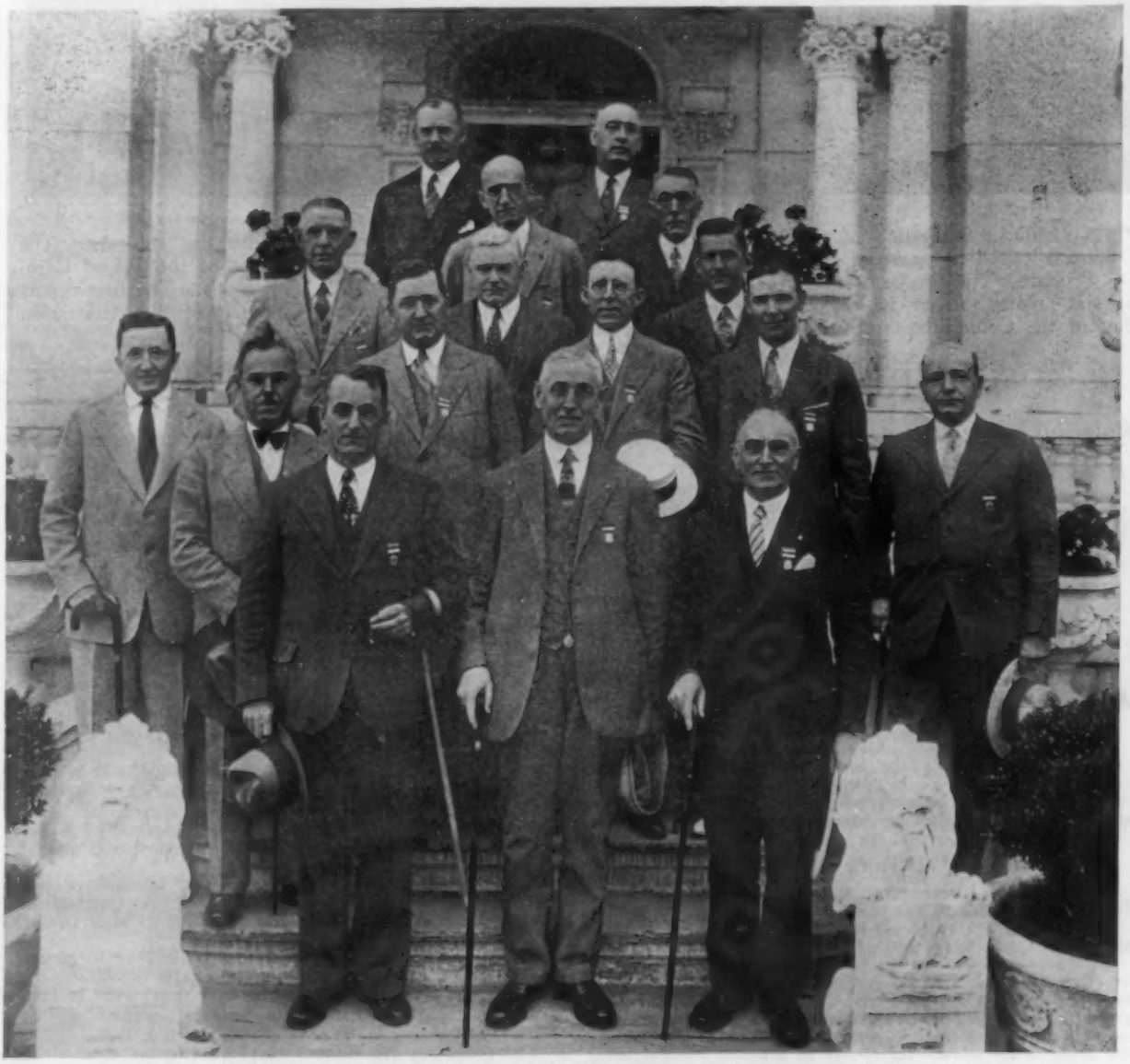
N. Y. C. Man—"Well, he knows what those valves are for just as well as you know what the valves on the gas stove in your kitchen are used for."

Surely, an apt answer.

In Thursday's Daily, Walter C. Sanders, of the Timken Roller Bearing Company, and Howard L. Spohn, of the Gardner Advertising Agency, who won the bridge championship at the A. E. R. A. convention in Cleveland last year, challenged any bridge players for the championship of this convention. R. J. O'Brien, vice-president, and H. N. Ransom, eastern sales manager of the Waugh Equipment Company, took up the challenge with disastrous results to Messrs. Sanders and Blake C. Hooper, of the Baker-Raulang Company, a tournament player of wide reputation who substituted for Mr. Spohn. In fact, the rout was so complete that Messrs. O'Brien and Ransom are laying the claim to the bridge championship of the convention, unless challenged by would-be claimants to the title.

A. P. Prendergast, mechanical superintendent of the Texas & Pacific, one of whose new Texas Type locomotives is included in the track exhibit, is much pleased with the performance of the first order of these locomotives now in service. "The outstanding improvement in locomotive design and increased hauling and speed capacity of the motive power on the Texas & Pacific," he says, "is in keeping with the policy of President Lancaster, who has encouraged and supported his mechanical department in the progressive development of locomotives and improved shop facilities. This successful plan of gradual replacement of light and antiquated designed locomotives with modern motive power of improved special design on the Texas & Pacific, has contributed effectively and consistently in reducing operating ratio."

* * *

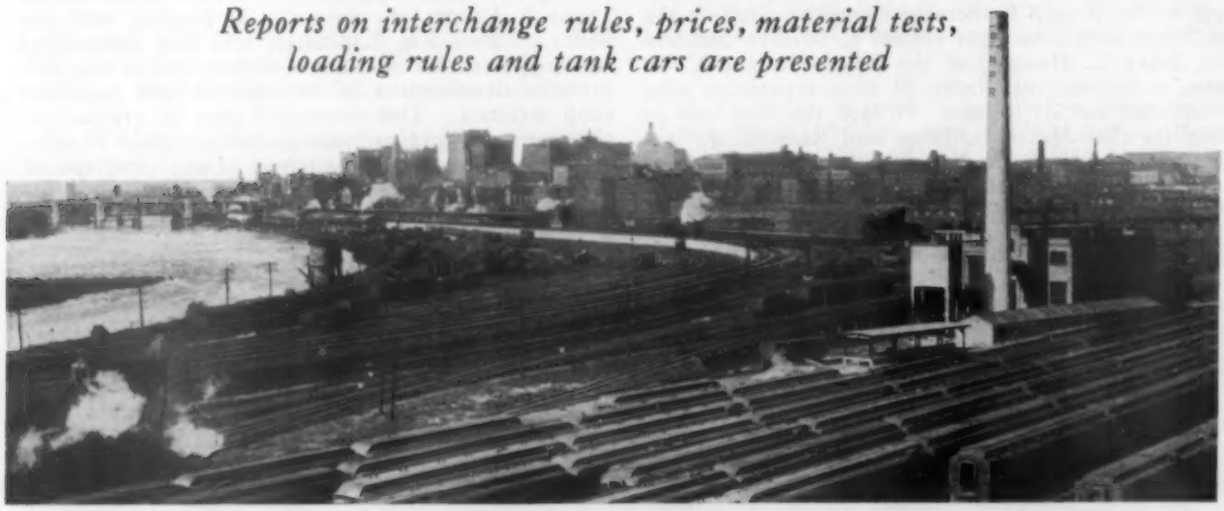


Executive Committee of the R. S. M. A.

Front Row, left to right: G. E. Ryder, J. D. Conway, W. H. S. Bateman.
Second Row: F. J. O'Brien, W. E. Wine, N. C. Naylor, S. G. Down, V. W. Ellet, Franklin H. Smith.
Third Row: H. E. Daniels, Arthur Allan, George T. Johnson.
Fourth Row: Charles H. Gayetty, Charles C. Castle.
Fifth Row: R. J. Himmelright, D. L. Eubank.

The Second Car Session of the Mechanical Division

Reports on interchange rules, prices, material tests, loading rules and tank cars are presented



TUESDAY'S meeting of the Mechanical Division was called to order at 9.30 a. m. by Chairman Smart. The program called for the presentation of six reports, all of which, with the exception of that of the Committee on Specifications and Tests of Materials, dealt exclusively with car subjects. The last report on the program—that of the Wheel Committee—was carried over until today. The first report taken up at the meeting was that of the Arbitration Committee.

Report of the Arbitration Committee

Rules 26 and 35 are new———Proposed new wheel manual responsible for many changes in rules

T. W. Demarest
Chairman

During the year Cases 1533 to 1590, inclusive, have been decided and copies sent to the members. A copy of these decisions is made part of this report. A vote of concurrence in the decisions is respectfully requested by the committee.

Attention is again called to the fact that the Arbitration Committee will not consider questions under the Rules of Interchange unless submitted in the form of Arbitration cases as per Rule 123.

Freight Car Rules

All recommendations for changes in the Rules of Interchange submitted by members, railroad clubs, private car owners, etc., have been carefully considered by the committee and, where approved, changes have been recommended.

Rule 2

The committee has approved the following modifications of Interpretation No. 5 to this rule:

Proposed Form—(5) Q.—Is it permissible to add shop expense and store expense to the cost of transfers?

A.—*For the expense of transfer or adjustment of lading on or after August 1, 1928, unless otherwise agreed, bill shall be rendered on basis of the direct actual labor and material expense, to the total of which shall be added 25 per cent to represent all forms of overhead expenses, but which percentage does not apply to nor include the service of a wreck crane if used; the wreck crane to be charged at the established rate.*

Reason—It is felt an arbitrary percentage to cover both direct and indirect supervision is preferable. This modification has been approved by the Transportation Division for application to Car Service Rule 14.

Accordingly, present Interpretation No. 7 of this rule will be eliminated.

Rule 3

The committee recommends that the effective date of the fourth paragraph of Section (a) to the sixth paragraph of Section (b) be extended to January 1, 1930.

Reason—The present situation justifies this extension.

The committee recommends that no extension be made in the effective date of third paragraph of Section (c).

The committee recommends that present Paragraphs 4 and 5 of Section (c) be renumbered 5 and 6 respectively; and new Paragraph No. 4 be added to this Section as follows:

Proposed Form—(4) *Couplers having liner blocks applied between the butt and riveted yoke, if not integral with either the butt or yoke, prohibited, effective January 1, 1929, on all cars. In interchange.*

Reason—Repairs of this character are unsafe and should be discouraged.

The committee recommends that the effective date of the first paragraph of Section (f) be extended to January 1, 1930.

Reason—The present situation justifies this extension.

The committee recommends that first paragraph of Section (t) be modified and the effective date extended to October 1, 1929, as follows:

Proposed Form—(1) Trucks, *new, shall be equipped with* cast-steel side frames conforming to A. R. A. specifications, *when applied to new or rebuilt car bodies* on or after *October 1, 1929.* From owners.

Reason—To provide for cars contracted for prior to January 1, 1929, delivery of which might be made early in 1929.

Extension of effective date of the above requirement to January 1, 1929, was authorized by the General Committee and announced in Circular D. V.—566, issued March 5, 1928.

The committee recommends that the effective date of the fourth paragraph of Section (t) be extended to January 1, 1930, and that the effective date of the sixth paragraph of Section (t) be extended to January 1, 1930.

Reason—The present situation justifies this extension.

The committee recommends that present Paragraph 2 of Section (u) be eliminated, and new Paragraphs 2 and 3 added to this section of this rule, as follows:

Proposed Form—(2) *Underframe, etc.: Effective January 1, 1931, no car of all-wood construction (now defined as Class F under Rule 112) will be accepted. From owners.*

(3) *Underframe, etc.: Effective January 1, 1934, no car of all-wood underframe equipped with metal draft arms extending 24 in. or more beyond the center line of the body bolster (now defined as Class E-4 under Rule 112) will be accepted. From owners.*

Reason—The gradual elimination of cars of the above construction is in the interest of safe and economical operation.

The committee recommends that Interpretation No. 4 to this rule be eliminated.

Reason—Account of changes in the requirements and recommended practice.

The committee recommends that, if revised Rule 112 as prepared by the Special Committee on Rebuilt Cars is approved by the association, second and third paragraphs of Section (a), first and sixth paragraphs of Section (b), first and fourth paragraphs of Section (c), first and second paragraphs of Section (f), Section (j), second paragraph of Section (s) and first paragraph of Section (u), be modified, to be effective with effective date of revised Rule 112, as follows:

Proposed Form—(a) (2) A. R. A. standard triple valves required on all cars built *new* on or after January 1, 1919, *and on all cars rebuilt on or after (effective date revised Rule 112.)* In interchange.

(a) (3) Axles, A. R. A. standard, required on all cars built *new* on or after October 1, 1915, *and on all cars rebuilt on or after (effective date revised Rule 112).* In interchange.

(b) (1) Brake beams, A. R. A., on all cars built *new* on or after January 1, 1917, *and on all cars rebuilt on or after (effective date revised Rule 112),* must be of not less than the capacity of the No. 2 beam. In interchange.

(b) (6) Brake beams on all cars built *new* on or after September 1, 1909, *and on all cars rebuilt on or after (effective date revised Rule 112),* must be hung from the trucks, effective January 1, 1930. From owners.

(c) (1) Couplers, A. R. A. Standard Type D with 6x8 shank, required on all cars built *new* on or after November 1, 1920; *and A. R. A. Standard Type D with 5x7 or 6x8 shank, required on all cars rebuilt on or after (effective date revised Rule 112).* From owners.

(c) (4) Coupler operating levers connected direct with coupler lock or lift without the use of links, clevises, clevis pins or chains, required on all cars built *new* on or after January 1, 1919, *and on all cars rebuilt on or after (effective date revised Rule 112).* In interchange.

(f) (1) Flat cars built new on or after January 1, 1918, *and flat cars rebuilt on or after (effective date revised Rule 112),* must have the side stake pockets spaced minimum 2 ft. and maximum 4 ft. Effective January 1, 1930, the foregoing requirement will also apply to *all flat* cars built prior to January 1, 1918. From owners.

(f) (2) Flat cars built *new* on or after July 1, 1928, *and flat cars rebuilt on or after (effective date revised Rule 112),* must be equipped with stake pockets 4 in. wide by 5 in. deep. Effective January 1, 1930, the foregoing requirement will also apply to *all flat* cars built prior to January 1, 1928. From owners.

(j) Journal bearings A. R. A. Standard, required on all cars built *new* on or after January 1, 1920, *and on all cars rebuilt on or after (effective date revised Rule 112).* In interchange.

(s) (2) Stenciling: Date built *new,* month and year, or badge plate giving this information, required on all cars. *Date rebuilt, in addition to date built new, month and year, or badge plate giving this information, required on all cars rebuilt on or after (effective date revised Rule 112).* From owners. Cars built prior to 1895 may be stenciled "built prior to 1895" or bear badge plate giving this information. For tank cars the body and tank should bear distinctive dates, unless constructed at same time.

(u) (1) Underframe, steel, on all cars (other than tank cars) built *new* on or after January 1, 1927, *or rebuilt on or after (effective date revised Rule 112),* must have center sills with a minimum cross sectional area of 24 square inches *(a tolerance of one square inch below minimum will be considered as meeting the requirements)* between the draft back stops. From owners.

Reason—To cover interchange requirements for rebuilt cars in connection with revised Rule 112.

Rule 9

The committee recommends that the second requirement ("cast or reinforced back") following the item of "Brake shoes, applied," be eliminated.

Reason—Because Rule 19 requires application of reinforced back brake shoes.

The committee recommends that the first requirement following the item of "Cars reweighed and remarked," be changed from name of road to *station symbol.*

Reason—To clarify the intent of the rule.

Rule 17

The committee recommends that Section (d) of this rule be modified, as follows:

Proposed Form—(d) If the car owner elects, on account of improper repairs, to remove an A. R. A. type D, former A. R. A. standard or temporary standard coupler in good condition, *the same shall be credited at secondhand value, except the 5x5 shank coupler body, for which scrap credit shall be allowed;* charge for coupler *applied shall be* confined to secondhand value.

Reason—The car owner should not be required to allow secondhand credit for obsolete 5x5 shank coupler bodies in standardizing wrong repairs.

The committee recommends that Section (h) of this rule be modified, as follows:

Proposed Form—(h) Arch bars, brake shafts, sill steps *and their supports,* uncoupling levers, grabirons, *and ladder sides and their supports,* must not be welded.

Reason—As recommended by the Committee on Safety Appliances.

Rule 19

The committee recommends that in the last paragraph of this rule the word "should" be changed to "must."

Reason—To clarify the intent of the rule.

Rule 22

The committee recommends that in the second paragraph on page 52 of this rule the reference be changed to read, "as shown in Figs. 13, 13-A or *13-B.*"

Also, that the caption be added immediately below the figure number of Fig. 13-B, on page 49, reading, "Method of Splicing A. R. A. Center Sill."

Reason—For reference purpose.

Rule 23

The committee recommends that fifth item under Section IV of this rule be modified to read *"Draft lugs or draft arms"* in place of "Draft castings."

Reason—To clarify the intent of the rule.

Rule 24

The committee recommends that second paragraph of this rule be eliminated.

Reason—As recommended in the 1927 report of the Committee on Wheels.

New Rule 26

The committee recommends a new Rule 26, to be effective August 1, 1928, as follows:

Proposed Form—Rule 26. Where necessary to renew an arch bar, or a tie bar, and the construction of truck and car body will permit, it shall conform to the following requirements, and, so far as practicable, be of A. R. A. design; the renewal to be confined to the defective bar or bars:

Forty-ton trucks (5x9 in. journals)—Arch bar 1¾x4½ in. or 1½x5 in.; Tie bar ⅝x4½ in. or ¾x5 in.

Fifty-ton trucks (5½x10 in. journals)—Arch bar 1¾x5 in. or 1½x6 in.; Tie bar ⅝x5 in. or ⅝x6 in.

The top and bottom arch bars on the same side of the truck, shall be connected in accordance with one of the methods shown on Plates 1, 2, 3 and 4; and the tie bar, when renewed, shall have turned up ends as shown on the same plates.

These requirements apply where renewals are made either by the car owner or by foreign roads.

Any increased cost resulting from, and the expense of alteration necessary for the first application of these details, shall be charged to the car owner. Scrap credits shall be allowed for undamaged parts thus removed.

Reason—As recommended in 1927 report of Committee on Car Construction.

New Rule 35—Delivering Company Responsible

The committee recommends a new Rule 35, as follows:

Proposed Form—Empty cars offered in interchange should have the hopper doors and drop doors in closed position.

The expense of closing such doors on empty cars (in interchange) when not secured within 3 in. of the closed position, may be charged for on authority of a defect card in accordance with Rule 107.

Reason—Hopper and drop doors should be closed as a measure of safety to trainmen, as recommended by the General Committee of the Transportation Division.

Rule 36

The committee recommends that in the last paragraph of Section 2 (Commodity Cards) of this rule the words *"and one card on each end"* be added after the words "one card on each side."

Reason—For the convenience of switchmen.

Rule 44

The committee recommends that in Section (1) of this rule the phrase, *"or split or broken due to such conditions"* be inserted after the words "old defects."

Reason—To clarify the intent of the rule.

Rule 58

The committee recommends that the phrase, *"also missing interior parts of triple valves,"* be added at the end of this rule.

Reason—The interior parts of triple valves cannot become missing in fair usage.

Rule 66

The committee recommends that the effective date which makes the owners responsible for periodical repacking of journal boxes be extended to January 1, 1929.

Reason—As authorized by the General Committee and announced in Circular D. V.—566, issued March 5, 1928.

Rule 68

The committee recommends that the following sentence be added to the first paragraph of this rule: *"Length of flat spots must be measured by the gage shown in Fig. 1 and applied as shown in Fig. 2."*

Reason—For easier reference.

Rule 71

The committee recommends that this rule be modified, as follows:

Proposed Form—Shelled out: *Cast-iron or cast-steel* wheels *with* shelled-out spots 2½ in. *long* or over, *as measured with gage shown in Fig. 1 and applied as shown in Fig. 2.*

Burnt rim, shattered rim, spread rim, sub-surface defect, shelled tread: Wrought-steel or steel-tired wheels having these defects. See paragraphs 30 to 34 and Fig. 16 to 38 in Wheel Manual for identification of defects.

Reason—To separate defects in wrought-steel wheels, as recommended by the Committee on Wheels.

Rule 73

The committee recommends that this rule be modified, as follows:

Proposed Form—Worn through chill: *See paragraph—and Figure— in Wheel Manual for identification of this defect.* Care must be taken to distinguish this defect from flat spots caused by sliding wheels.

Reason—As recommended by the Committee on Wheels in connection with the new wheel manual.

Rule 74

The committee recommends that the words *"under cars"* be deleted from the first paragraph of this rule.

Also, that the same words be deleted from the note under Fig. 3 on Page 88.

Also, that the words *"cars"* be deleted from the notes under Fig. 4 on Page 89.

Reason—In order to clarify the intent that the marked capacity of the car does not govern, where the marked capacity of the car does not correspond with the capacity of the truck. For example, car marked 60,000 lb. capacity equipped with 80,000 lb. capacity trucks.

The committee recommends that a new third paragraph be added to this rule, as follows:

Proposed Form—Determination of worn flanges must be made with the gage shown in Fig. 1 and applied as shown in Figs. 3 and 4.

Reason—As recommended by the Committee on Wheels in connection with the new wheel manual.

Rule 75

The committee recommends that this rule be modified, as follows:

Proposed Form—Brake burn: *Cast-iron or cast-steel* wheels *with transverse cracks or comby treads* due to heating. *See paragraph .. and Figs. .. to .. in Wheel Manual.*

Thermal cracks: Wrought-steel or steel-tired whels. See paragraph 35 and Figs. 39 to 43 in the Wheel Manual.

Reason—As recommended by the Committee on Wheels in connection with the new wheel manual.

Rule 77

The committee recommends that this rule be modified, as follows:

Proposed Form—Burst *hub: Any wheel with radial crack in hub. See paragraphs 48 and .. and Figs. 53, 54 and .. in Wheel Manual.*

Reason—As recommended by the Committee on Wheels in connection with the new wheel manual.

Rule 78

The committee recommends that first paragraph of this rule be modified, as follows:

Proposed Form—Flange, plate or bracket, cracked or broken; or, *with chip from* flange exceeding 1½ in. in length *by* ½ in. in width: *Cast-iron or cast-steel wheels.*

Reason—To limit rule to cast-iron and cast-steel wheels and eliminate tread and hub which are covered in other rules, as recommended by the Committee on Wheels.

The committee recommends that second paragraph of this rule be modified, as follows:

Proposed Form—Rim, broken or chipped—*cast-iron and cast-steel wheels. Measurements to be made with gage shown in Fig. 1 and applied as shown in Figs. 5 and 5-A.*

Reason—As recommended by the Committee on Wheels in connection with the new Wheel Manual.

Rule 79

The committee recommends that first paragraph of this rule be modified, as follows:

Proposed Form—Thin Tread: Wrought-Steel Wheels.—If tread is worn so that tread thickness is ¾ in. or less. The measurement of the tread thickness must be taken on the back of the rim *with the Standard Steel Wheel Gage as shown in Fig. 4-A and Passenger Rules Fig. 4.*

Reason—As recommended by the Committee on Wheels in connection with the new Wheel Manual.

Rule 80

The committee recommends that this rule be modified, as follows:

Proposed Form—Wrought-steel wheel with cracked or broken plate, *or with hole burned in plate, or other evidence of use of torch or arc. See paragraph 44 to 47 and Figs. 49 to 52 in Wheel Manual.*

Steel-tired wheels with cracked or broken plate, bolt, retaining ring or tire, *or with loose tire.*

Reason—As recommended by the Committee on Wheels in connection with the new Wheel Manual.

Rule 81

The committee recommends that this rule be modified, as follows:

Proposed Form—Any wheel loose or out of gage. See Fig. 9.

Reason—To make clear that the rule applies to all types of wheels.

Rule 82

The committee recommends that this rule be modified, as follows:

Proposed Form—Cast-iron, cast-steel or one-wear wrought-steel wheels condemnable by the remount gage (Figs. 7 and 8) must not be applied to foreign cars. This gage must not be used for condemning wheels under cars.

Reason—To limit the use of remount gages to the proper types of wheels, as recommended by the Committee on Wheels.

Rule 83

The committee recommends that this rule be eliminated.

Reason—Account of the use of gages covered in each appropriate rule, as recommended by the Committee on Wheels.

Rule 93

The committee recommends that this rule be modified to provide that additional separate statements shall be made for:

Fourth. For expense of closing hopper and drop doors, on authority of defect card per Rule 35.

Fifth. For expense of applying and removing placards, etc., per Rule 36.
Reason—For accounting purposes.

Rule 98

The committee recommends that the following sentence be added to the second paragraph of Section (f) of this rule: *Also see paragraph .. of Wheel Manual for method of determining amount of service metal.*
Reason—For reference purpose.

Rule 108

The committee recommends that the last item of Section (a) of this rule be modified, as follows:
Proposed Form—Unions *or connections,* tightened.
Reason—To clarify the intent of the rule.

Rule 112

The committee recommends that last paragraph of Section (a) of this rule be modified, as follows:
Proposed Form—If it is decided not to repair, the owner shall be immediately advised. *Such owner when furnishing settlement value, may instruct the handling line to return cast-steel truck side frames; metal truck and body bolsters; metal draft arms, friction draft gears; cast-steel yokes; metal ends; and special castings and valves on tank cars. The handling line promptly shall ship to owner, f. o. b. point of shipment, the parts so designated, provided they are found to be in serviceable condition; the car owner shall give full shipping and routing instructions and for the serviceable parts returned shall pay the scrap value of such parts per A. R. A. Rule 101 prices, plus the same depreciated per-pound price as obtains in settlement for entire car.*
Reason—To afford the car owner the opportunity to make further use of such details as an economical proposition.

Rule 120

The committee recommends that first paragraph of Section (e) of this rule be modified, as follows:
Proposed Form—(e) If owner authorizes destruction, handling line shall allow credit for all material at A. R. A. scrap prices, less labor cost of destruction. *However, owner shall have the privilege of having returned to him serviceable cast-steel truck side frames; metal truck and body bolsters; metal draft arms; friction draft gears; cast-steel yokes; metal ends; and special castings and valves on tank cars; by attaching to his statement of estimated weights a list of such parts with instructions showing where they are to be shipped; such parts to be billed at A. R. A. scrap value plus 15 per cent for handling, f. o. b. point of shipment.*
Reason—To afford car owner the opportunity to make further use of such details as an economical proposition.

Rule 124

The committee recommends that this rule be modified, as follows:
Proposed Form—The Arbitration Committee shall *give consideration to requests for* changes, amendments and additions to these rules prior to each annual *meeting,* and it shall report its recommendations to the succeeding annual *meeting.*
Reason—To conform to present practice.

Passenger Car Rules of Interchange

Rule 7

The committee recommends that third paragraph of Section (f) of this rule be modified, as follows:
Proposed Form—Shelled out: *Cast-iron and cast-steel* wheels *with shelled out spots 1 in. long or over.*
Burnt rim, shattered rim, spread rim, sub-surface defect, shelled tread: Wrought-steel and cast-steel wheels with checks or crac s due to heating which extend into the throat of the flange or are in the flange or when in the tread are over 2¾ in. in length; or with comby spot 1 in. long or over.
Thermal cracks: Wrought-steel and steel-tired wheels. See paragraph 35 and Figs. 39 and 42 in Wheel Manual.
Reason—As recommended by the Committee on Wheels in connection with the new Wheel Manual.
The committee recommends that sixth paragraph of Section (f) of this rule be modified, as follows:
Proposed Form—Worn flange—wrought-steel, steel-tired or cast-steel wheels: With flange $1\frac{15}{16}$ in. thick or less, or having flat vertical surface extending 1 in. or more from tread, *as determined by gage as shown in Figs. 3 and 4 of freight code.*
[The remainder of paragraph (6) is to be deleted.—Editor.]
Reason—As recommended by the Committee on Wheels in connection with the new Wheel Manual.

The committee recommends that seventh, eighth and ninth paragraphs of Section (f) of this rule be modified, as follows:
Proposed Form—(7) Burst *hub:* Any wheel *with radial crack in hub.*
(8) Flange, rim, plate brackets or any other part of wheel, either cracked, chipped, seamy or broken under fair usage. All wheels.
(9) Broken, cracked *or loose* bolts, retaining ring or tire, occurring under fair usage. Steel-tired wheels.
Reason—As recommended by the Committee on Wheels in connection with the new wheel manual.
The committee recommends that twelfth paragraph of Section (f) of this rule be modified, as follows:
Proposed Form—Thin tread—Wrought-steel wheels: If tread is worn so that tread thickness is 1 in. or less. See Fig. 4.
Steel-tired wheels: If tread is worn to within ¼ in. of measuring line (inside edge of limit of wear groove) as shown in Figs. 1, 2 and 3.
Service metal *and tread thickness of* wrought-steel wheels shall be measured by the A. R. A. *standard* steel wheel gage or its approved equivalent *applied on the back of the rim. See Fig. 4-A of the freight code.*
Also, recommend that the wording on the cut shown as Fig. 4 on page 242 of the passenger code be modified to show the one-inch condemning limit to read "Passenger cars and *road engine* tenders" instead of "Passenger cars and tenders;" and the ¾-inch condemning limit to read "Freight cars *and yard engine tenders*" instead of "Freight cars."
Reason—As recommended by the Committee on Wheels in connection with the new wheel manual.

Rule 8

The committee recommends the addition of the item of *"drain cocks"* in Section (g) of this rule.
Reason—Drain cocks missing on passenger equipment cars are properly delivering line defects.
The report is signed by T. W. Demarest, (chairman), general superintendent motive power, Pennsylvania; J. E. O'Brien, vice-chairman, chief motive power and equipment, Seaboard Air Line; F. W. Brazier, assistant to general superintendent motive power and rolling stock, New York Central; J. J. Hennessey, assistant superintendent car department, Chicago, Milwaukee, St. Paul & Pacific; J. Coleman, assistant general superintendent car equipment, Canadian National; H. L. Shipman, general car foreman, Atchison, Topeka & Santa Fe; G. F. Laughlin, general superintendent, Armour Car Lines; and Thos. Beaghen, Jr., Mexican Petroleum Corporation.

Discussion

During the presentation of the report, Committee Chairman Demarest directed attention to Section (t) of Rule 3 involving the question of truck side frames, on which action was taken at the Montreal meeting of the Division last year. The committee offered an addition to the proposed form of paragraph (1) in the report as follows: "Existing trucks shall be equipped with cast steel side frames or arch bars conforming to A. R. A. specifications when applied to new or rebuilt car bodies on or after October 1, 1928.—Editor.

J. J. Tatum (B. & O.): There has been a change suggested which I do not understand. Mr. Demarest said—if I understood him correctly—that trucks applied to new or rebuilt cars must be M. C. B. standard. Is that correct?

T. W. Demarest (Penna.): In connection with the proposed addition to our recommended change in Rule 3 as written in the report, we simply covered the application of new trucks to new cars, or to rebuilt car bodies. We understand, of course, that it is also permissible to apply existing trucks to new cars or rebuilt cars.

Under the conditions as we have left Rule 3 without any addition at all, there is absolutely nothing to interfere with building a new car after the effective date of this rule or rebuilding a car. There is nothing to interfere with placing any kind of a truck that you so select under that car. It may not be a truck which we think meets the requirements of present operating conditions. We have therefore proposed an additional paragraph to cover the

specifications of an existing truck when applied to a new car or a rebuilt car after October 1, 1928. We believe it advisable and to be the intent of the Association and the General Committee. For instance, the General Committee issued circular D. V. 566, "Effective dates of various requirements and rules and standards, extensions of," dated March 5, 1928. In part, in paragraph 1, this circular advises as follows:

"Also, the rule is not intended to interfere with the use of trucks now existing, except that old trucks applied to new cars or new car bodies shall be made to conform to the arch bar standards that are in effect at the date such cars or bodies are built."

We also had before us circular 2719, in connection with the matter of new and rebuilt cars, which came to us by order of the Interstate Commerce Commission. In Section E, paragraph 1, it says as follows: "A new car is an additional unit equipped with either new or second-hand trucks." Then you may skip down to the last portion of the last sentence. "Provided car complete, including second-hand details, conforms with all of the A. R. A. interchange requirements for new cars for Rule 3 in effect at the date of construction."

We do not believe this Association is consistent without limiting in some way the type of existing truck which may be applied to new cars or rebuilt cars after October 1, 1928. We feel that the Association had in mind that such a truck when applied should at least conform to A. R. A. specifications for the strength of the truck and details in existence at the time the car was built or rebuilt.

Mr. Tatum: As I read this proposed change in the rule it says, "Existing trucks shall be equipped with cast steel side frames or arch bars conforming to A. R. A. specifications when applied to new or rebuilt car bodies on and after October 1, 1928." What specifications? Those specifications now in existence, or the new specifications that are about to become effective? The Car Construction Committee has recommended that a new set of specifications for trucks be provided by the Specifications Committee, and that those requirements or specifications be improved. If that is true, then a large number of railroads throughout this country have built cars and trucks for such cars in accordance with existing specifications. When the new specifications become effective that have been improved, if I may apply this rule literally, those trucks would not be suitable to apply to a new car or a new body.

I know of more than one railroad that have large numbers of cars in service that will shortly require new bodies. The trucks under those cars have given satisfactory service for the last 15 years or longer. Should they not meet the new specifications, if this applies to the new specifications, on one particular road having 9,000 such cars 18,000 trucks might be scrapped.

Those trucks might be disposed of by repairing cars in kind or trucks in kind, but that opportunity may not present itself. That company may decide to buy a large number of new bodies of an improved type under which to place those trucks, and if I read this correctly, and the specifications should be improved for the new A. R. A. truck, I am afraid they might be denied the use of those trucks. If that is so, I for one am opposed to such a rule.

Mr. Demarest: In relation to what specifications were meant, the committee had only one thing in mind and can propose nothing else to you except that these specifications to which they refer were the specifications in effect at the time the new car was built or the body was rebuilt. The proposed addition to paragraph (t), in Rule 3, does not mean any more or any less than that; that these specifications to be followed in the application of existing trucks to new cars or rebuilt cars, at the date such car was built new or rebuilt, would be the specifications for trucks in existence at that time. Is that clear?

Mr. Tatum: I move that the report of the Arbitration Committee be adopted as presented, but I recommend that the proposed amendment to the report be admitted to letter ballot so that each and every railroad will have an opportunity to give it a careful consideration and vote as to whether such a rule should become effective.

P. Cass, (C. R. I. & P.): I second the motion.

R. L. Kleine (Penna.): The proposed addition, to cover existing trucks, is one of the propositions that we considered with the rebuilt car. I think it essential that we have some specification for an existing truck, whether it be with cast steel side frame or arch bars, if we are going to apply it to a new or rebuilt car.

Mr. Tatum brings up one point and that is whether existing trucks should conform to new standards or specifications that are adopted from time to time. There may be a dividing line some place, where existing trucks that are modern trucks and do not quite come up to the improved or tighter specifications, should be permitted to be used. But when we consider cast steel side frame trucks which do not meet present specifications, to say nothing of new specifications, then such a truck should not be considered for either a new or rebuilt car, since the new or rebuilt car settlement figures are naturally based on modern construction.

Rather than submit this matter to letter ballot it would probably be better to adopt the report of the Arbitration Committee, with the amendment, and fix the specifications for existing trucks in accordance with the standards as they are now on our records, and make them subject to change in specifications for existing trucks from time to time. If Mr. Tatum would accept an amendment to his motion, to refer that matter jointly to the Car Construction Committee and the Arbitration Committee, his point will be covered and the rules will be in proper shape for the use of existing trucks of proper design. I assume that the adoption of Rule 112, that is, the modifications in Rule 112, is subject to the approval by letter ballot of Rule 112 by the roads.

Mr. Tatum: If we are right, or if this proposed new rule or change in rule is right, what have we to fear? We are not sacrificing safety when we use a device that has proved itself safe. There are trucks under cars that have given satisfactory service and will continue to do so and I will not be a party to scrapping such trucks. The expense of this proposed change in the rule is far-reaching. Mr. Kleine has suggested some interpretation that he put on it or might put on it, but I interpret the rule as it is written.

F. W. Brazier (N. Y. C.): Mr. Kleine has the same idea that I have. If you cannot trust the Committee on Car Construction and the Arbitration Committee to bring out all the facts you better wipe us out. A letter ballot is often taken in a hurried way. But if you will leave this matter of the amendment to the committee's report as outlined by Mr. Kleine, I think you will all be satisfied. Therefore, I second Mr. Kleine's amendment.

(*The amendment was carried.*)

(*The original motion to accept the report was restated, including this amendment, and the final motion—that the report be accepted and the amendment be referred to a joint committee from the Arbitration and Car Construction Committees—was seconded and carried.*)

Report of Committee on Prices for Labor and Materials

Material, labor and equipment costs analyzed and price changes suggested for more equitable billing

A. E. Calkins
Chairman

In order that the rules may currently provide an equitable basis for interroad billing, the committee has continued the work of analyzing material, labor and new equipment costs in A. R. A. Interchange Rules 101, 107, 111 and 112 of the freight car code and Rules 21 and 22 of the passenger car code, with a view of determining and recommending necessary changes to be made in the supplement, effective August 1, 1928.

All miscellaneous material prices in Rule 101 were rechecked as of March 1, quotations from purchasing agents of eleven railroads, representing 39 per cent of total freight car ownership in the United States and Canada, indicating that no changes were necessary in new or scrap prices except in the case of couplers, journal bearings and lumber. On account of error in the previous calculation, the price of the 10-inch axle has also been corrected.

Some criticism having been received in regard to credits allowed for friction draft gears, your committee arranged for field studies to be conducted at several points on a number of railroads, gears removed being taken apart and examined in detail. The result of this study developed that the present credit of 25 per cent of the price new, complete, for gears removed on account of a defective friction casing or defective casing and one or more parts other than a casing, as shown in the note preceding Item 250 of Rule 101, is correct. Also, that the credit for gears removed on account of any part or parts other than the casing being defective, shown in the current code at 50 per cent, should be increased to 60 per cent of the price new, complete, and your committee so recommends. Two new items covering additional types of friction draft gears are included in this rule.

In new Item 155-A we are recommending a price on a pound basis for steel side and end doors for house cars.

Based on data received from eleven large representative roads in March, 1928, no change is warranted at this time in the hourly labor allowances.

It is the opinion of your committee that specific labor allowances in Rule 107, originally based on time studies on wooden equipment, should be revised to provide for such repairs to steel equipment on rivet basis; and it is, therefore, recommended that the note following Item 433 of Rule 107 be eliminated and a new note to provide for repairs made by riveting or combination of bolts and rivets be incorporated under the various items involved.

New Item 60-B is recommended covering the application of brake hanger pin or carrier standard to Vulcan truck side frames. Also, new Item 222-B to provide that no labor charge shall be made for journal box dust guard plug. Also, new Item 292 covering R. & R. or R. spring plank on swing motion truck.

The wording of Items 70, 117, 120, 121, 122, 228, 300, 443, 452 and 456-A has been revised to clarify the intent. Items 122-A and 224 are eliminated on account of being covered in other items.

Item 122-E is revised to provide an additional charge in connection with coupler and draft gear operations when draft pan or carrier irons is riveted.

The allowance under Item 243 has been increased as a result of time studies of the operation.

Modification of wording to clarify the intent is recommended under Item 34 and second note following Item 36 of Rule 111.

Recommendations are made in Rule 112 respecting reproduction pound prices of new freight train cars of all classes in order that Supplement of August 1, 1928, may reflect 1927 costs in lieu of 1926 figures shown in the present Code. The prices submitted for your approval will be found to follow the trend which occurred in the 1927 market covering total new equipment purchases as compared with 1926. Pound prices for refrigerator, poultry and tank cars are based on figures furnished by representative roads and private lines in the United States and Canada. Prices for all other equipment represent the average selling price set up by Presidents' Conference Committee, which secured quotations on total output of several large United States car manufacturers. Figures from Canadian roads were not used as their total ownership is less than one-tenth that of United States carriers and effect of including same in weighted average would be negligible.

A new note is recommended under this rule to cover an additional allowance where care are equipped with two-wear wrought-steel wheels.

Settlement prices have been set up in this rule for the new classes of tank cars authorized by the container specifications and approved by the interstate commerce commission.

There being very few "Insulated cars with heater pipes, Class III only" in service, and no quotations available for any of these cars built during 1927, it is recommended that settlement price for this class of car be changed from the per pound basis to the reproduction cost basis, the same as Class V cars.

On account of the many types of heater pipes applied to tank cars designed for various commodities, and the wide variation in cost and weight of such pipe, it was felt impossible to make an equitable basis for settlement under the method shown in the current rules; and it is recommended that prices for Classes I, II, III, IV, 103-A, 104, and 104-A tank cars should apply, regardless of whether or not they are equipped with heater pipes; but with additional allowance where equipped with such pipes two inches or more in diameter. Consideration was also given to heater pipes under two inches in diameter but it was the conclusion that owner would be reimbursed by the additional weight on the per pound basis for the non-piped car.

Changes in material prives of eleven items under passenger car rule 22, are recommended, based on quotations as of March 1 from the purchasing agents of eleven representative roads.

It is the intent of the committee to investigate labor and material costs again in October, and if sufficient change develops, necessary revision will be made and inserted in the rules effective January 1, 1929.

The changes recommended in the existing rules are shown on sheets attached.

Changes Recommended in the Interchange Rules

Rule 101

The words *net, applied,* have been added to Item No. 16 of this rule. The following new items of material are proposed to be added under this rule:

Item No.	Material	Present 8-in.	Present 10-in.	Proposed 8-in.	Proposed 10-in.
16-A	Centrifugal dirt collector, 1-in. or 1¼-in., average credit	...	...	.05	.05

Item No.	Material	Present Charge	Present Credit	Proposed Charge	Proposed Credit
155-A	Door, steel, side or end, house cars, applied to car, per lb. Note.—Credit to equal the weight charged, except upon authority of defect card covering missing door.	....	....	.13	.055

Item No.	Name of Gear and Type	Length of Gear (Inches)	Length of Pocket (Inches)	Price per End of Car	
277-A	National M-16	20⅛	20⅛	$37.40	
281-A	Symons M	22⅛	24⅛	43.90	Exclusive of wedge end cap follower plate.

The committee recommends the note preceding item No. 250, shown on page 125, be amended, effective August 1, 1928, to provide that the present credit of 50 per cent for complete gears removed on account of any part or parts other than casing being defective, be increased to 60 per cent of the price new, complete.

Rule 107

Under this rule the committee proposes the addition of the following note to Item Nos. 4, 5, 60, 61, 71, 98, 98-A, 155, 157, 160, 161, 166, 169, 189, 241, 242, 247, 251, 280, 281, 391, 392 and 397:

Note.—When rivets are used, the charge shall be made on a rivet basis. When a combination of rivets and bolts are used, the charge shall be made on a rivet and bolt basis.

The following note is proposed to be added to Item No. 122:

Note.—When a coupler is removed at the same time, charge additional labor as per Item 120.

The following note is proposed to be added to Item No. 300:

Note.—This also applies to sheathing above, between or below the end door or the end and side vent openings.

Minor changes in the wording have been made to Items Nos. 70, 117, 120, 122-B, 154, 156, 158, 228, 272-A, 381, 443, 452 and 456-A.

Items 122-A, 224 and the note after Item 433 have been eliminated.

The following new items are proposed for addition to this rule:

Item No.	OPERATION	Proposed Hours, ordinary car	Proposed Hours, refrigerator car
60-B	Brake hanger pin or carrier, riveted, Vulcan, Andrews, or similar type trucks, renewed (includes brake hanger R. & R. or R.) (add jacking of car when necessary)	0.8	0.8
222-B	Journal box dust guard plug	No charge to be made.	
292	Spring plank, swing motion truck, R. & R. or R., includes R. & R., includes R. & R. of bolster, hangers, springs, bolts and lags (add jacking of car when necessary)	4.2	4.2

Rule 111

The words, *or to apply cylinder gasket,* have been added to the end of Item 34. The following has been added to the second note following Item 34. The words, *bolts securing cylinder to reservoir,* have been added to the end of the first sentence and the words, *renewed in cases where the cylinder or reservoir is not R. & R. R.* have been added to the end of the last sentence under this item.

[In addition to the new items, the committee also recommends in Rule 112, six changes in labor prices under six items, all of which are increases. There were seven decreases in labor prices as applied to work on refrigerator cars.—Editor]

Passenger Car Rule 22

Item No.	MATERIAL	Present Charge	Present Credit	Proposed Charge	Proposed Credit
13	Burners, round wick, applied, each	$0.51	.....	$0.40	.....
14	Candles, per lb.	.19	.....	.17	.....
20	Chimneys, round wick, applied, each	.19	.....	.17	.....
23	Gas mantles, applied, each	.36	.....	.39	.....
25	Hose, 1¼, 1½ or 1¾ in., traight port, steam, complete with fittings, applied	$6.15	$3.03	6.62	$3.26
37-D	Pipe, extra heavy wrot, per ft., 1¼ in.	.38	.01	.26	.01
37-G	Couplings, extra heavy wrot, 2 in.	.20	.....	.37	.....
37-H	Elbows, extra heavy wrot, 2 in.	.20	.....	.32	.....
37-I	Nipples, extra heavy wrot, 2 in.	.23	.....	.14	.....
37-J	Reducing or Street elbows, extra heavy wrot, 2 in.	.32	.....	.49	.....
37-K	Unions, lip type, extra heavy wrot, 2 in.	.30	.....	.45	.....

Passenger Car Rule 22

The report is signed by A. E. Calkins (chairman), superintendent rolling stock, New York Central; Ira Everett, chief car inspector, Lehigh Valley; J. K. Watson, assistant car foreman, Atchison, Topeka & Santa Fe; E. H. Weighman, master car builder, Kansas City Southern; P. Kass, superintendent car department, Chicago, Rock Island & Pacific; T. J. Boring, general foreman, M. C. B. clearing house, Pennsylvania; H. H. Harvey, general car foreman, Chicago, Burlington & Quincy; H. H. Boyd, assistant chief mechanical engineer, Canadian Pacific; A. E. Smith, vice-president, Union Tank Car Company, and A. H. Gaebler, master car builder, Swift Refrigerator Transportation Company.

Discussion

J. S. Lentz (L. V.): I move the report be adopted.

(*The motion was carried.*)

Report on Specifications and Test for Materials

Specifications for hose, chain, coupler pivot pins and malleable castings revised

F. M. Waring
Chairman

Your committee submits the following recommendations:

Revision of Standard Specifications

Exhibit A—Specifications for air brake and train air signal hose: These specifications have been revised largely as to form in order to clarify the meaning. Changes in substances are: To make the friction test minimum requirement 16 lb. between tube and duck and between cover and duck, in accordance with present practice of construction; the use of the method of making set tests that is standard for all types of hose and new limits for tube and cover which permit the use of a compound that the manufacturer's state will be more resistant to deterioration in service; the omission of the porosity test which is of doubtful value and has been generally omitted by purchasers; increase in tensile strength of tube and cover from 800 to 900, and 700 to 800 lb. per sq. in. respectively. All of the changes have been in the interest of securing a more serviceable and lasting hose.

Exhibit B—Label for air brake and signal hose: Revised as to designation of marking required for name of railroad and date manufactured to clarify meaning. No change in substance. To replace cut in air brake and signal hose specifications and on page 15, Section E of Manual.

Revisions of Recommended Practice Specifications

Exhibit C—Specifications for wrapped and braided air, gas and oxygen hose: This is a revision of the present separate specifications for wrapped and for braided air hose to combine them into one specification together with additional requirements for gas and oxygen hose.

Exhibit D—Specifications for chain: The present specifications cover ordinary wrought iron and steel chain, but not crane chain. These specifications cover a wrought iron crane chain and an ordinary purpose wrought iron or steel chain. Tables of dimensions of links, breaking strengths and proof loads have been revised and put on a logical basis in conformity with results of a large amount of data from manufacturers and consumers. These specifications have been discussed with the chain manufacturers and it is believed that their adoption and use by the American Railway Association will do much towards standardizing quality and dimensions for this material which at the present time is subject to unimportant but annoying differences in requirements of various railroad specifications. It is recommended that these specifications be adopted as recommended practice rather than as standard until they have been given a thorough trial by the members.

Exhibit E—Specifications for coupler knuckle pivot pins: It is recommended that the present standard specifications be replaced by these proposed specifications as recommended practice. The scope of the specifications has been enlarged to cover pins of various sizes and bars for making pins. The drop test has been placed on a formula basis to take care of various sized pins. No change has been made in the test requirements for the standard 1⅜-in. pin. The chemical requirements for manganese have been changed from not over .70, to .50 to .90 per cent, and for sulphur from .05 to .06 per cent.

Exhibit F—Specifications for malleable iron castings: These have been revised to include a requirement for minimum yield point and an increase in elongation together with some change in form and minor requirements. They have been discussed with representative manufacturers and are believed to be in agreement with the improved quality of malleable castings that are now available.

The report was signed by F. M. Waring (chairman), engineer of tests, Pennsylvania; C. P. Van Gundy, engineer of tests, Baltimore & Ohio; Frank Zeleny, engineer of tests, Chicago, Burlington & Quincy; A. H. Fetters, mechanical engineer, Union Pacific, H. G. Burnham, engineer of tests, Northern Pacific; J. C. Ramage, engineer of tests, Southern; J. H. Gibboney, chemist, Norfolk & Western; F. T. Quinlan, Engineer of tests, New York, New Haven & Hartford; T. D. Sedwick, engineer of tests, Chicago, Rock Island & Pacific; G. N. Prentiss, engineer of tests, Chicago, Milwaukee, St. Paul and Pacific; H. W. Faus, engineer of tests, New York Central; H. D. Browne, engineer of tests, Chicago & North Western; E. E. Chapman, engineer of tests, Atchison, Topeka & Santa Fe Railway.

Exhibit A—Specifications for Air-brake and Train Air-signal Hose

1. *General*—Hose furnished to these specifications will be inspected and tested in accordance with the general instructions on standard methods of tests for rubber goods as adopted by the American Railway Association.

2. *Scope*—These specifications cover wrapped air-brake and air-signal hose for train service.

I. Manufacture

3. *Construction*—The hose shall consist of:
(a) An inner rubber tube.
(b) Reinforcement of plies of cotton duck.
(c) An outer rubber cover.
(d) End caps of rubber.

4. *Rubber Tube*—The rubber tube shall be smooth, uniform in quality and thickness and free from injurious defects.

5. *Cotton Reinforcement*—(a) The reinforcement shall consist of not less than four plies of cotton duck cut on a bias of approximately 45 degrees and applied evenly and firmly over the tube with not less than ½ in. lap not sewed. The plies of duck shall be well frictioned on both sides with a rubber compound which shall firmly join the plies to the rubber tube and the cover and to each other.

(b) The cotton duck shall be evenly woven from high grade cotton, be free from mechanical defects and be sufficiently strong to enable the hose to withstand the hydrostatic test and at the same time be soft and pliable.

6. *Rubber Cover*—The rubber cover shall be uniform in quality and thickness and free from injurious defects.

7. *Rubber End Caps*—Each length of hose shall have a rubber cap firmly vulcanized on each end.

II. Physical Properties and Tests

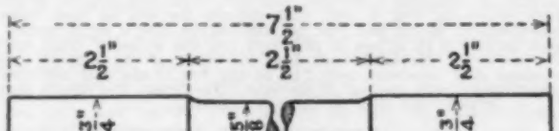
8. *Test Samples*—(a) For each lot of 200 pieces of hose one extra piece of hose shall be furnished free of charge. From each such lot of 201 pieces one sample for test purposes shall be selected at random by the inspector representing the purchaser.

(b) Five 1-in. long sections shall be cut from one end of the test sample. One of these sections shall be used for making the friction and stretching tests, and one for making the tensile test; the remaining three 1-in. sections may be used for making any additional tests desired. The remaining 17-in. length of the sample shall be used for the pressure tests.

9. *Friction Test*—This test shall be made with the following weights and the unwindnig shall not exceed 4 in. in four minutes:

Between plies of duck, lb.	20
Between tube and duck, lb.	16
Between cover and duck, lb.	16

10. *Permanent Set Test*—Test specimens cut from the tube and cover shall be stretched until the marks of the 2-in. gage length are 10 in. apart, so held for two minutes, released, and measured at the expiration of two minutes. The permanent set shall be the difference between the original 2-in. gage length and the final length and for the tube shall not be less than $^{9}/_{32}$ in. and not more than $^{13}/_{32}$ in. and for the cover not less than $^{7}/_{32}$ in. and not more than $^{10}/_{32}$ in.



Malleable Iron Test Specimen

11. *Tension Test of Tube and Cover*—The tensile strength of the tube shall not be less than 900 lb. per sq. in. and of the cover not less than 800 lb. per sq. in. Gage marks originally 2 in. apart shall have stretched to at least 12 in. before the specimen breaks.

12. *Hydrostatic Test*—The 17-in. section of hose shall be subjected to a hydrostatic pressure of 200 lb. per sq. in., applied at the rate of not less than 100 lb. per sq. in. in 6 seconds. The expansion in circumference at this pressure shall not be more than ¼ in. for air brake or $^{21}/_{32}$ in. for air signal hose. The hose shall not show any leaks or other defects. After the above test the same section of hose shall then be subjected to a hydrostatic pressure of 500 lb. per sq. in. for 10 minutes without showing any leaks or other defects and without bursting; after which the pressure will be increased until the hose bursts which shall not occur at a pressure less than 700 lb. per sq. in.

III. Standard Sizes and Dimensions

13. *Dimensions*—The dimensions of hose may vary in accordance with the following tolerances:

	Length inches	Outside diameter, inches	Inside diameter, inches	Thickness of cap vulcanized on, inches
Air-Brake Hose—				
Maximum	22½	2 5/16	1 7/16	5/16
Minimum	22	2 1/16	1 5/16	1/16
Air-Signal Hose—				
Maximum	22½	1 7/16	1 1/16	5/16
Minimum	22	1 11/16	1 5/16	1/16

14. *Thickness of Tube and Cover*—The minimum thickness at any point shall be not less than $^{9}/_{32}$ in. for the tube and $^{7}/_{32}$ in. for the cover.

IV. Workmanship and Finish

15. *Workmanship*—The hose shall be made in a workmanlike manner and shall be free from injurious defects.

16. *Finish*—The hose shall be smooth and regular in size throughout its entire length.

V. Markings

17. *Serial Number*—Each piece of hose in each lot of 201 or less pieces shall bear the serial number. Lot serial numbers shall begin with "1" on the first of the calendar year and continue consecutively until the end of the year.

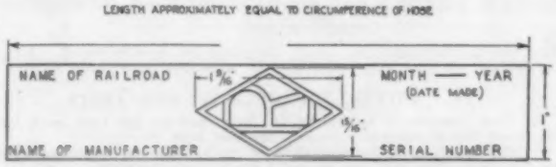
18. *Label*—Each length of hose shall have vulcanized on it a label of red rubber as shown in Figure 1. This label shall be applied around the hose at a point 6 in. from the end (a variation of ½ in. either way will be permitted) and with the top of the lettering toward the center of the hose. The use of a rectangular label in addition to the band label is optional with any railroad, provided a space, preferably 2 in., is allowed between the two labels.

VI. Inspection and Rejection

19. *Inspection*—(a) Unless otherwise specified, tests and inspection shall be made at the place of manufacture prior to shipment. The manufacturer shall notify the purchaser sufficiently in advance of the completion of the hose to permit of arrangements for inspection. The manufacturer shall afford the inspector representing the purchaser, free of charge, all reasonable facilities to satisfy him that the hose is being furnished in accordance with the specifications.

(b) The purchaser may make the test to govern the acceptance or rejection of the hose in his own laboratory or elsewhere. Such tests shall be made at the expense of the purchaser, and not later than 60 days after date of shipment.

20. *Rejection*—(a) Hose represented by samples which fail to conform to the requirements of these specifications will be rejected.



Label for Air Brake and Air Signal Hose

(b) Hose which, subsquent to above tests at the mills or elsewhere, and its acceptance, or prior to being placed in service, develops manufacturer's defects or fails to pass any of the tests herein required within 60 days from date of shipment, will be rejected.

21. *Rejected Samples*—Samples tested in accordance with this specification, which represent rejected material, shall be preserved for fourteen days from the date of the test report.

Exhibit C—Specifications for Air, Gas and Oxygen, Wrapped and Braided Hose

1. *General*—Hose furnished to these specifications will be inspected and tested in accordance with the General Instructions on Standard Methods of Tests for Rubber Goods as adopted by the American Railway Association.

Scope—These specifications cover both wrapped canvas and braided air hose for use with pneumatic drills, hammers, hoists and other pneumatic devices working at not more than 125 lb. pressure and for vacuum cleaning outfits, and also the same two reinforcement types of gas and oxygen hose for use with oxy-acetylene and similar cutting and welding apparatus.

I. Manufacture

3. *Construction*—The hose shall consist of:
(a) An inner rubber tube.
(b) Reinforcement of plies of cotton duck or braided cotton fabric.
(c) An outer rubber cover.
(d) A protective covering (when specified).

4. *Rubber Tube*—The rubber tube shall be smooth, uniform in quality and thickness and free from injurious defects.

5. *Cotton Reinforcement*—(a) The reinforcement shall consist of cotton duck for wrapped hose and braided fabric for braided hose. Both the duck and the fabric shall be made from high grade cotton, be free from mechanical defects and sufficiently stong to enable the hose to withstand the hydrostatic test and at the same time be soft and pliable.

DATE	Railroad	SERIAL NO.	A. R. A.
	Wrapped or Braided, Air or Gas Hose—Size		
	Manufacturer		

Label for Air or Gas Hose

(b) *Wrapped Hose*—The plies of cotton duck shall be cut on a bias of approximately 45 degrees and applied evenly and firmly over the tube with not less than ½ in. lap, not sewed. The plies of duck shall be well frictioned on both sides with a rubber compound which shall firmly join the plies to the rubber tube and cover and to each other. The number of plies of cotton duck shall be

Inside Diameter of Hose, In.	Number of Plies
¼, ⅜	Optional with Manufacturer
½, ¾	4
1, 1¼, 1½	5

(c) *Braided Hose*—The fabric shall be firmly braided over the rubber tube. The plies of fabric shall be impregnated with a rubber compound which shall firmly join the plies to the rubber tube and cover and to each other. There shall be a sufficient coating of rubber compound between the plies so as to form a distinct layer of rubber. The number of plies for sizes ¼ in. and ⅜ in. shall be optional with the manufacturer. All other sizes shall have three pliesh.

6. *Rubber Cover*—The rubber cover shall be uniform in quality and thickness and free fom injurious defects.

7. *Protective Covering*—The protective covering shall be of wire armor or woven cotton jacket, as follows:

(a) *Wire Armor*—For hose 1in. and under, the armor shall be 5/32 in. x 1/16 in. half oval galvanized steel wire, wrapped with ⅜ in. space between adjacent turns. For hose over 1 in., the armor shall be 5/16 in. x 3/32 in. half round galvanized steel wire, wrapped with ⅜ in. space between adjacent turns. Any other size of half round or half oval wire of equal or greater area shall be considered the equivalent to the sizes specified.

(b) The weight of the woven cotton jacket per lineal foot shall be not less than the following:

Inside diameter of hose, in.	Minimum weight, oz. per lin. ft.
¼	¾
½	1
¾	1½
1	2
1¼	2½
1½	3

II. Physical Properties and Tests

8. *Test Sample*—A sample 36 in. long shall be cut from each lot of 500 ft. or less of each size of each kind of hose.

9. *Friction Test*—This test shall be made with the following weights and the unwinding shall not exceed 4 in. in four minutes:

(a) *Wrapped Hose*—
Sizes ¼ in. and ⅜ in.—
Between the plies, lb. 10
Between the cover and plies and the tube and plies, lb. 7

All other sizes—
Between the plies, lb. 18
Between the cover and plies and the tube and plies, lb. 15

(b) *Braided Hose*—
Sizes ¼ in. and ⅜ in.—
Between the tube and plies, lb. 7
Between the cover and plies, lb. 5

All other sizes—
Between the tube and plies and between the cover and plies, lb. 12

Note—Where the size of hose makes it impractical to obtain an unwinding of as much as 4 in., the rate of unwinding must not exceed 4 in. in 4 minutes.

10. *Permanent Set Test*—Test specimens cut from the tube and cover shall be stretched until the marks of the 2 in. gage length are 7 in. and 8 in. apart, respectively, so held for two minutes, released, and measured at the expiration of two minutes. The permanent set shall not be more than 32/32 in.

11. *Tension Test of Tube and Cover*—The tensile strength shall be not less than 800 lb. per sq. in., for the tube, and 900 lb. per sq. in. for the cover, except that for the ¼ in. and ⅜ in. sizes of gas and oxygen hose the tensile strength of the tube shall be not less than 700 lb. per sq. in. and of the cover not less than 800 lb. per sq. in. The elongation at the breaking load shall not be less than 5 in. for the tube and 6 in. for the cover.

12. *Hydrostatic Test*—The remainder of the 36 in. sample, after all other test pieces have been cut therefrom, shall be subjected to a hydrostatic pressure applied at the rate of not less than 100 lb. per sq. in. in 6 seconds and shall withstand without bursting or developing other defects the indicated pressure maintained for 10 minutes for the respective sizes of hose shown in the following table:

Inside Diameter of Hose, In.	Test Pressure lb. per sq. in. Wrapped hose	Braided hose
¼	800	800
⅜	625	600
½	625	700
¾	625	625
1	625	550
1¼	550	450
1½	550	375

III. Standard Sizes and Dimensions

13. *Standard Sizes*—(a) *Diameter*—The standard sizes shall be as follows:

Air Hose—
¼ in., ⅜ in., ½ in., ¾ in., 1 in., 1¼ .n. and 1½ in. inside diameter.

Gas and Oxygen Hose—
¼ in. inside diameter and 21/32 in. outside diameter.
⅜ in. inside diameter and 29/32 in. outside diameter.

(b) *Length*—Unless otherwise specified, wrapped hose shall be furnished in 50 ft. lengths, and braided hose for the sizes 1 in. and smaller shall be furnished in approximately 500 ft. lengths; and for the 1¼ in. and 1½ in. sizes in approximately 250 ft. lengths.

14. *Thickness of Tube and Cover*—The minimum thickness of tube and cover shall be as follows:

	Wrapped Hose		Braided Hose	
Inside Diameter, In.	Tube	Cover	Tube	Cover
¼, ⅜	0.0625 in.	0.031 in.	0.0625 in.	0.031 in.
½, ¾, 1, 1¼, 1½	0.094 in.	0.062 in.	0.094 in.	0.062 in.

15. *Tolerance*—(a) For wrapped hose, the inside diameter may vary either way from that specified by not more than 1/64 in. for sizes ¼ in. to ⅜ in. and by not more than 1/32 in. for larger sizes.

(b) For braided hose, the inside diameter may vary either way from that specified by not more than 1/32 in. for the sizes ⅜ in. and smaller, and by not more than 1/16 in. for the larger sizes.

(c) The outside diameter may vary either way from that specified in Section 13 (a) by not more than 1/32 in.

IV. Marking

16. *Color*—The color of the rubber cover of all hose shall be black, except that hose ordered as being intended to convey acetylene or other gas except oxygen and air shall be red.

17. *Label*—Each length of hose shall have the prescribed labels of a distinctly different color from that of the rubber cover inlaid therein and vulcanized thereto. When lengths of less than 50 ft. are specified, the labels shall be located approximately in the center of the length of hose. Lengths over 50 ft. shall have the label spaced not more than 2 ft. apart. On wrapped hose, lengths of 50 ft. shall have the label located approximately 3 ft. from each end. The label shall be of general form shown in Fig. 1, and shall indicate the size of hose, name of manufacturer, month and year of manufacture, and a serial number for each lot of 500 ft. or less of each kind and size of hose. When specified on the order, the label shall bear the name of the railroad. Serial numbers shall commence with "1" on the first of the year and continue consecutively until the end of the year. The letters and figures shall be 1/32 in. in relief and shall be clear nad distinct.

V. Inspection and Rejection

18. *Inspection*—(a) Unless otherwise specified, tests and inspection shall be made at the place of manufacture prior to shipment. The manufacturer shall notify the purchaser sufficiently in advance of the completion of the hose to permit of arrangements for inspection. The manufacturer shall afford the inspector representing the purchaser, free of charge, all reasonable facilities to satisfy him that the hose is being furnished in accordance with the specifications.

(b) The purchaser may make the test to govern the acceptance or rejection of the hose in his own laboratory or elsewhere. Such tests shall be made at the expense of the purchaser, and not later than 60 days after date of shipment.

19. *Rejection*—(a) Hose represented by samples which fail to conform to the requirements of these specifications will be rejected.

(b) Hose which, subsequent to above tests at the mills or elsewhere, and its acceptance, or prior to being placed in service, develops manufacturer's defects, or fails to pass any of the tests herein required within 60 days from date of shipment, will be rejected.

20. *Rejected Samples*—Samples tested in accordance with this specification which represent rejected material, shall be preserved for fourteen days from the date of test report.

Table I.—Proof Tests and Tensile Strength

Nominal size of chain bar, in.	Proof test loads, lb.		Breaking load, lb.		Safe working load, lb.	
	Crane chain wrought iron	Proof coil iron or steel	Crane chain wrought iron	Proof coil iron or steel	Crane chain wrought iron	Proof coil iron or steel
¼	1,767	1,700	3,535	3,400	1,060	850
5/16	2,760	2,650	5,520	5,300	1,655	1,325
3/8	3,975	3,850	7,950	7,700	2,385	1,925
7/16	5,415	5,250	10,830	10,500	3,250	2,625
½	7,072	6,850	14,145	13,700	4,240	3,425
9/16	8,947	8,650	17,895	17,300	5,370	4,325
⅝	11,047	10,700	22,095	21,400	6,630	5,350
¾	15,900	15,350	31,800	30,700	9,540	7,675
⅞	21,622	20,900	43,245	41,800	12,960	10,450
1	28,275	27,350	56,550	54,700	16,950	13,675
1⅛	33,400	.....	66,800	.....	20,040	.....
1¼	41,250	.....	82,500	.....	24,750	.....
1⅜	49,900	.....	99,800	.....	29,910	.....
1½	59,350	.....	118,700	.....	35,600	.....
1⅝	69,750	.....	139,500	.....	41,800	.....
1¾	80,800	.....	161,600	.....	48,450	.....
1⅞	92,750	.....	185,500	.....	55,300	.....
2	105,500	.....	211,100	.....	63,300	.....

Exhibit D—Specifications for Chain

I. Material and Manufacture

1. *Scope*—These specifications cover two classes of chain generally used for the following purposes:

Crane Chain, for slings, hoists, steam shovels, and marine uses, and where an all-iron chain is desired.

Proof Coil, for railroad cars, construction and forestry work.

2. *Material*—The material shall be as follows:

Crane Chain—Wrought-iron, which shall be made from all pig puddled iron, free from any admixture of iron scrap or steel.

Note—The term "iron scrap" applies only to foreign or bought scrap and does not include local mill products of crane chain iron quality.

Proof Coil—Wrought-iron or open-hearth steel. The wrought iron may be made from all reworked scrap.

Note—The term "reworked scrap" applies to steel and iron scrap or a mixture of both.

3. *Welding*—Crane chain shall be lap-fire welded. Unless otherwise specified, Proof Coil chain may be made by either fire or electric welding process.

4. *Chemical Composition*—The wrought iron and steel of the respective classes of chain shall conform to the following requirements as to chemical composition:

	Iron Crane	Steel Proof Coil
Manganese, maximum, per cent	0.10	....
Phosphorus, maximum, per cent	....	0.04
Sulphur, maximum, per cent	....	0.04

5. *Check Analyses*—(a) Analyses may be made by the purchaser from the bars or from the finished chain. The chemical composition thus determined shall conform to the requirements specified in Section 4.

(b) Drillings for analysis shall be taken with a drill the diameter of which is approximately one-half the diameter of the bar from which the drillings are taken, and cuttings shall be taken through the bar from surface to surface.

III. Physical Properties and Tests

6. *Proof Tests*—(a) All chain shall be proof tested by subjecting it to the loads shown in Table I, and when so tested it shall stand these loads without showing any defects.

(b) When requested, the manufacturer shall furnish a certificate of proof test to the purchaser or his representative.

7. *Tension Tests*—(a) Samples from finished chain shall conform to the minimum requirements as to tensile strength specified in Table I.

(b) The elongation, determined in a gage length of from 12 to 18 in. to the nearest link, shall be not less than 15 per cent. for both Crane and Proof Coil chain.

8. *Test Specimens*—Tension test specimens shall consist of a length not less than 2 ft. cut from the finished chain.

9. *Number of Tests*—One tension test shall be made to represent each lot of 200 ft. of chain or fraction thereof ordered.

10. *Retests*—If the tension test fails to conform to the requirements specified in Section 7, two additional tension tests may be made from the same lot, each of which shall meet the requirements of Section 7.

11. *Etch Tests—Crane Chain*—The cross section of the test specimen shall be ground or polished, and etched for a sufficient period to develop the structure. The structure shall be uniform and characteristic of wrought iron free from steel.

A solution of 10 per cent. hydrochloric acid (sp. gr. 1.19), 30 per cent sulphuric acid (sp. gr. 1.84), and 60 per cent. water; or 25 per cent. nitric acid (sp. gr. 1.42), and 75 per cent. water, is recommended for the etch test.

IV. Standard Weights and Dimensions

12. *Nominal Weights and Lengths*—(a) The nominal weights of 100 ft., nominal lengths of 100 links and nominal dimensions of links for chain of various sizes are given in Table II.

(b) The weights and lengths of 100 links of chain shall not vary more than 4 per cent. over nor more than 4 per cent. under the nominal weight and lengths specified in Table II. Excess weight over the permissible variations of 4 per cent. may be cause for rejection. All chain accepted shall be paid for at actual weight.

(c) The length shall be measured after the chain has been proof tested and shall be measured to the inside of the end links.

(d) In determining the length of the chain, a load not exceeding 10 per cent. of the proof load specified in Table I, shall be applied to take up the slack.

13. *Workmanship and Finish*—(a) The chain shall be free from injurious defects and shall have a workmanlike finish. The diameter of the bar in all chain shall not be less than the nominal size in the body and welds, and unless otherwise specified, the weld shall not exceed the diameter of the bar more than 25 per cent.

(b) Prior to testing and inspection the chain shall be free from paint or other coating which would tend to conceal defects.

VI. Inspection and Rejection

14. *Inspection*—(a) The inspector representing the purchaser shall have free entry at all time while work on the contract of the purchaser is being performed, to all parts of the manufacturer's works which concern the manufacture of the chain ordered. The manufacturer shall afford the inspector, without charge, all reasonable facilities to satisfy him that the the chain is being furnished in accordance with these specifications.

(b) Unless otherwise specified, all tests and inspection shall be made at the place of manufacture, but when specified by the purchaser, he may make the tests and inspection to govern the acceptance or rejection of the chain at his own laboratory or elsewhere at his own expense.

(c) Tests and inspection shall be so conducted as not to interfere unnecessarily with the operation of the works.

15. *Rejection*—(a) Unless otherwise specified, any rejection based on tests, made in accordance with Section 14 (b), shall be reported within five working days from receipt of samples.

(b) Chain which subsequent to the above tests at the mill or elsewhere and its acceptance, or prior to being placed in service, develops manufacturing defects will be rejected.

16. *Rehearing*—Samples tested in accordance with Section 14 (b), which represent rejected chain, shall be preserved for two weeks from the date of the test report.

Exhibit E—Specifications for Coupler Knuckle Pivot Pins

1. *Scope*—These specifications cover all heat-treated carbon steel knuckle pivot pins and other coupler pins; also bars for making pins.

I. Manufacture

2. *Process*—The steel shall be made by the open-hearth process.

3. *Heat Treatment*—The pins shall be properly heat-treated to meet the requirements of the physical tests.

II. Chemical Properties and Tests

4. *Chemical Composition*—The steel shall conform to the following requirements as to chemical composition.

Carbon	0.55—0.75 per cent.
Manganese	0.50—0.90 per cent.
Phosphorus, not over	0.05 per cent.
Sulphur, not over	0.06 per cent.

5. *Ladle Analyses*—An analysis shall be made by the manufacturer from a test ingot taken during the pouring of each melt, to determine the percentage of carbon, manganese, phosphorus, sulphur and silicon. Drillings for analysis shall be taken not less than ¼ in beneath the surface of the test ingot. A copy of this analysis shall be given the purchaser or his representative. This analysis shall conform to the requirements specified in Section 4.

6. *Check Analyses*—A check analysis shall be made from the finished material representing each melt, by the purchaser or his representative, and shall meet the requirements specified in Section 4.

III. Physical Properties and Tests

7. *Drop Test*—(a) This test shall be made on a standard A. R. A. drop-test machine, or a drop-test machine that will give equivalent results, the pin resting on rounded supports held rigidly 10 in. center to center. If made on a standard A. R. A. machine, the pin shall be struck one blow by a tup weight 1,640 or 2,240 lb., falling from a height determined from the following formula:

For 1640-lb. Tup: $H = 1.16\ d^2$

For 2240-lb. Tup: $H = 0.85\ d^2$

in which "H" is the height of the drop in feet and "d" is the diameter of the pin in inches. The height of drop for the standard 1⅜ in. pin shall be 3.0 feet (36 in.), for 1640-lb. tup and 2.25 feet (27 in.) for 2240-lb. tup.

(b) The pin shall show a deflection of not less than 15 deg., nor more than 30 deg., without cracking or breaking.

8. *Number of Tests*—The manufacturers shall furnish, free of charge, one extra pin with each lot of 200 or less.

Table II.—Nominal Weights and Dimensions

Nominal size of chain bar, in.	Actual size of Material, in.	Nominal length of 100 links, in.		Nominal weight per 100 ft., lb.		Nominal dimensions of links, in. Crane chain				Proof coil			
						Outside		Inside		Outside		Inside	
		Crane chain	Proof coil	Crane chain	Proof coil	Length	Width	Length	Width	Length	Width	Length	Width
¼	⅛	86	100	78	70	1 11/32	1	11/32	5/16	1 1/32	1 1/32	1	1/4
5/16	1/8	100	111	115	105	1 1/32	1 1/32	1	5/16	1 11/32	1 1/32	1 1/32	5/16
3/8	1/8	109	123	166	158	1 11/32	1 1/32	1 1/32	3/8	2 1/32	1 1/32	1 11/32	3/8
7/16	1/8	122	138	220	210	2 1/32	1 1/32	1 1/32	11/32	2 11/32	1 11/32	1 11/32	3/8
1/2	1/8	134	150	275	265	2 11/32	1 11/32	1 11/32	3/8	2 1/32	1 1/32	1 1/32	3/8
9/16	1/8	156	173	350	335	2 3/8	1 11/32	1 1/32	3/8	2 11/32	2 1/32	1 3/8	7/16
5/8	1/8	169	188	430	410	3	2 1/32	1 11/32	7/16	3 1/32	2 1/32	1 1/32	1
3/4	1/8	188	213	615	580	3 1/32	2 1/32	1 1/32	1	3 11/32	2 11/32	2 1/32	1 1/32
7/8	1/8	225	250	820	780	4 1/32	3 1/32	2 1/32	1 1/32	4 1/32	3 1/32	2 1/32	1 1/32
1	1/8	256	275	1,045	1,000	4 1/32	3 1/32	2 1/32	1 1/32	4 11/32	3 1/32	2 3/32	1 1/32
1 1/16	1/8	288	....	1,310	....	5 1/32	3 11/32	2 1/32	1 1/32	....	....	....	....
1 1/8	1/8	306	....	1,600	....	5 1/32	4 1/32	3 1/32	1 3/32	....	....	....	....
1 3/16	1/8	363	....	1,930	....	6 1/32	4 11/32	3 1/32	1 3/32	....	....	....	....
1 1/4	1/8	387	....	2,335	....	6 11/32	5 1/32	3 1/32	2	....	....	....	....
1 5/16	1/8	425	....	2,740	....	7 1/32	5 1/32	4 1/32	2 1/32	....	....	....	....
1 3/8	1/8	475	....	3,180	....	8 1/32	5 11/32	4 1/32	2 1/32	....	....	....	....
1 7/16	1/8	525	....	3,650	....	9 1/32	6 1/32	5 1/32	2 1/32	....	....	....	....
2	1/8	575	....	4,100	....	9 11/32	6 11/32	5 3/32	2 3/32	....	....	....	....

IV. Permissible Variations

9. *Permissible Variations*—The diameter of the pin may vary not more than plus or minus $^1/_{64}$ in. from that specified. The length shall not vary more than ⅛ in. below or above that specified.

V. Finish

10. *Finish*—The finished pin shall be straight, have a smooth surface, be uniform in diameter and shall not be painted.

VI. Markings

11. *Markings*—The manufacturer's name or identification marks shall be stamped on the head of each pin.

12. *Inspection*—(a) The inspector representing the purchaser shall have free entry at all times while work on the contract of the purchaser is being performed, to all parts of the manufacturer's works which concern the manufacture of the material ordered. The manufacturer shall afford the inspector, free of charge, all reasonable facilities to satisfy him that the material is being furnished in accordance with these specifications.

(b) The purchaser may make the tests to govern the acceptance or rejection of the material in his own laboratory or elsewhere. Such tests, however, shall be made at the expense of the purchaser.

13. *Rejection*—Material which, subsequently to above tests at the mills or elsewhere, and its acceptance, develops weak spots, cracks or imperfections, or is found to have injurious defects, will be rejected and shall be replaced by the manufacturer at his own expense.

14. *Rehearing*—Samples tested in accordance with the specification, which represent rejected material, shall be preserved for fourteen days from date of test report.

Exhibit F—Specifications for Malleable Iron Castings

[The essential changes in these specifications are contained in Sections 2 and 3, which are reproduced below. Other changes are largely in arrangement and not in substance, hence the remainder of the specifications are omitted.—Editor]

2. *Tension Tests*—(a) The tension test specimen shall conform to the following minimum requirements as to tensile properties:

Tensile strength, lb. per sq. in.	50,000
Yield point, lb. per sq. in.	30,000
Elongation in 2 in. per cent.	15

(b) The yield point shall be determined by the drop of the beam of the testing machine or by the divider method. The speed of the crosshead of the machine shall not exceed ½ in. per minute.

3. *Destruction Test*—If the purchaser or his representative so decides, 1 per cent. of the castings may be tested to destruction. Castings thus tested shall show good, tough malleable iron.

Discussion

A. H. Fetters (U. P.): I move the report be accepted and referred to letter ballot.

(*The motion was carried.*)

Report of the Committee on Loading Rules

Proposed form for printing rules not recommended—
New rules suggested to meet special conditions

Samuel Lynn
Chairman

Your committee has received during the year a number of recommendations for changes and additions to the rules, these recommendations being brought about by the introduction of wire or band tying methods for certain commodities in lieu of our present standard A. R. A. method. As a result of the new methods for securing the shipments, the committee has handled a large number of experimental shipments, a record being taken at the originating point of the shipment and then followed through to destination in order to determine whether the changes recommended were practical and safe.

Your committee still has a number of subjects under investigation. As a result of the work during the year, it submits the following changes and additions to the rules for your approval and submission to letter ballot for adoption as standards of the association.

At the annual meeting last year, J. J. Tatum (B. & O.), recommended on the floor of the convention, that the Loading Rules be revised and each rule be printed separately with suitable cuts, eliminating all cross references in order to simplify the rules and have them in such shape that they would be more easily interpreted by car inspectors and shippers. This recommendation was given careful consideration and was referred to a sub-committee of the Loading Rules Committee and the report of the sub-committee follows:

Form for Printing Loading Rules

Your committee has carefully investigated the change as suggested and finds that the plan is not feasible for the following reasons:

First—In applying the general rules to each rule pertaining to a particular commodity, it would require an enormous lot of duplication of paragraphs and figures showing the manner of loading.

Second—It would increase the size of the book from 277 pages to approximately 500 pages, making it more cumbersome for the inspectors to carry around in their pockets.

Third—The present form of the loading rules book cost 18 cents per copy. It requires approximately 72,000 copies of a new issue to supply the demands. The book printed in the form suggested, with new cuts, duplicate cuts, etc., would cost approximately 50 cents per copy or $36,000 for the supply as compared with approximately $13,000 in its present form. Your committee does not feel that this increased cost is warranted.

Fourth—Investigation with some of the shippers indicates that the shippers are not interested in a change of this kind. Practically all of the shippers are only interested in the commodity they ship and have no trouble in interpreting the rule pertaining to the loading of that commodity.

Fifth—So far as the committee can determine, the Baltimore & Ohio stands alone in making this recommendation, as no suggestions or recommendations from other roads have been received.

General Rules for Loading Materials

Rule 3

Proposed Form—All single cars must be so loaded that one hand brake is accessible and operative. *There must be a clearance of at least 6 in. between the brake wheel and lading immediately back of the brake wheel and a clearance of at least 12 in. between the brake wheel and lading on either side of the brake wheel; these clearances must extend to top of the lading. There must also be a clearance of at least 4 in. under the brake wheel. Beyond the specified brake wheel side clearance, the clearance between the lading and the outside face of the end sill must be not less than 12 in. except on gondola cars where the lading may be against the end.*

Explanation—This rule has been revised to permit a more intensive utilization of equipment. The modification was made at the request of a large shipper of various types of machinery, it being impossible to acquire the minimum weight on some cars without encroaching upon the provision of a 6 in. clearance for the full width of the car.

Rule 7

It is proposed to add the following as a note to this rule: "Note—A steel underframe car is one having steel center sills, steel side sills and steel body bolsters."

Explanation—The addition of the above note was requested by one of the large shippers so as to clarify the meaning as between wood and steel underframe cars.

Group I. Loading Lumber, Logs, Ties, Fence Posts, Tan Bark and Similar Products

Rule 126

The committee proposes to add the following sentence to the end of this rule:

Stakes or wiring will not be required when half the diameter of the top layer of logs 12 in. or more in diameter is below the top of the car sides.

Explanation—This rule has been revised to relieve technical exceptions which have been taken by car inspectors on account of no side stakes being applied to cars where a portion of large logs extend from 4 in. to 6 in. above the car sides.

Rule 141-A

Proposed Form—When short poles are loaded in connection with twin load, the two bottom tiers, the two top tiers, and the outside tier on each side, must extend beyond the stakes nearest to the outer end of the car. The shorter poles must be inter-

laced not less than 36 in. and they must be distributed so as to equalize the load as per Fig. 25.

Explanation—This rule has been proposed to permit shipments of short poles in connection with twin loads when loaded in the above manner. Shipments in accordance with the proposed method have been followed up in service and found satisfactory.

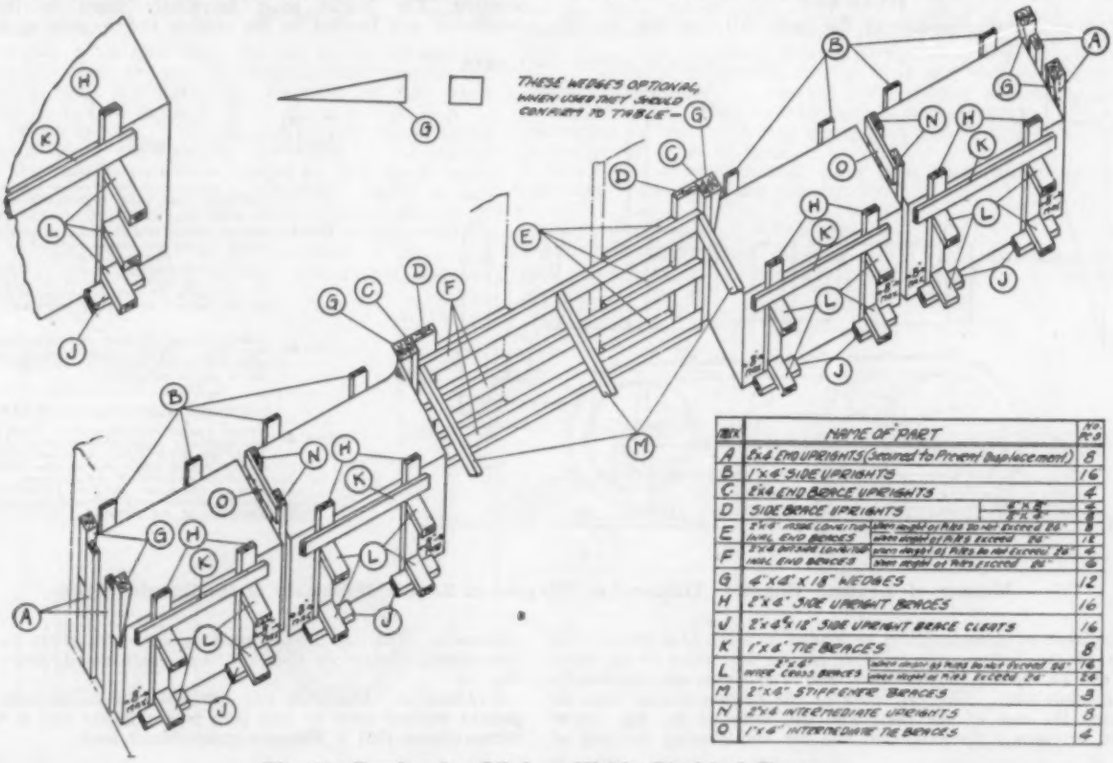
Rule 201-A

The committee proposes to add the following clause to the end of the second sentence in this rule:

Proposed Form—When plates are too wide to be loaded in accordance with Rule 201 they may be loaded in accordance with Fig. 44-E. When so loaded there must be at least four tie straps, each not less than ⅜ in. by 3 in. to each pile of plates 23 ft. or less in length and five tie straps each not less than ⅜ in. by 3 in. for each pile of plates over 23 ft. in length, *but for piles of one-half or less than carrying capacity of car the number of straps per pile may be reduced by one.*

[The remainder of the rule is unchanged.—Editor]

Explanation—It has been demonstrated by experimental shipments that this can be done.



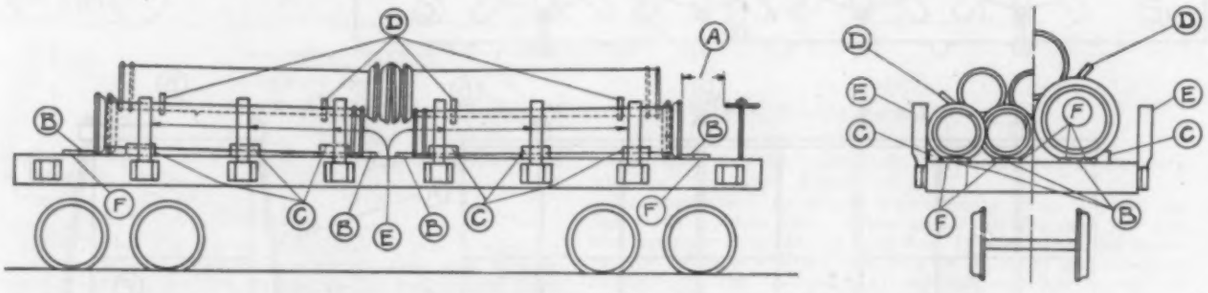
MK	NAME OF PART	NO PCS
A	8"x4" END UPRIGHTS (Secured to Prevent Displacement)	8
B	1"x6" SIDE UPRIGHTS	16
C	8"x4" END BRACE UPRIGHTS	4
D	SIDE BRACE UPRIGHTS	8"x4" 4 8"x6" 4
E	8"x4" INSIDE LONGITUDINAL BRACES, END BRACES	when height of Nos. do not exceed 36" 8 when height of Nos. exceed 36" 12
F	8"x4" DIAGONAL LONGITUDINAL END BRACES	when height of Nos. do not exceed 36" 4 when height of Nos. exceed 36" 6
G	4"x6"x18" WEDGES	12
H	8"x4" SIDE UPRIGHT BRACES	16
J	8"x4⅝"x18" SIDE UPRIGHT BRACE CLEATS	16
K	1"x6" TIE BRACES	8
L	8"x6" INNER CROSS BRACES	when height of Nos. do not exceed 36" 16 when height of Nos. exceed 36" 24
M	8"x6" STIFFENER BRACES	8
N	8"x4" INTERMEDIATE UPRIGHTS	8
O	1"x6" INTERMEDIATE TIE BRACES	4

Fig. 90—Bracing for Oiled or Highly Planished Sheets

Group II. Loading of Structural Material, Plates, Billets, Castings, Wheels, Pipe and Similar Products

Rule 201

The committee proposes to add the following sentence to the end of this rule:



MK	NAME OF PART
A	CLEARANCE NOT LESS THAN 6"
B	END BLOCKING 4"x5½"x16"
C	SIDE BLOCKING 8" LONG (END OF PIECE NEAREST EQUAL TO ONE-HALF THE DIAMETER OF THE PIPE, PROVIDED THAT BLOCKING MADE THICK ENOUGH SO THAT BLOCKING MADE THICK ENOUGH IN HEIGHT WILL NOT BE REQUIRED)
D	SOFT WOOD STRIPS 8"x6" BETWEEN ALL PIPE
E	SIDE STAKES 4"x5"x18" ABOVE CAR FLOOR
F	2"x6"x16" END BLOCKING CLEATS

Fig. 83—Manner of Loading Pipe 24 in. or More in Diameter on Flat Cars

When so loaded there must be at least three such clamps to each pile of plates 23 ft. or less in length and four such clamps for each pile of plates over 23 ft. in length.

Explanation—This rule has been revised to more clearly designate the number of clamps required.

Rule 216

Proposed Form—If the lading which butts against the end boards consists of only a single piece or two of a weight not exceeding a total of 6,000 lb., no end blocking is required.

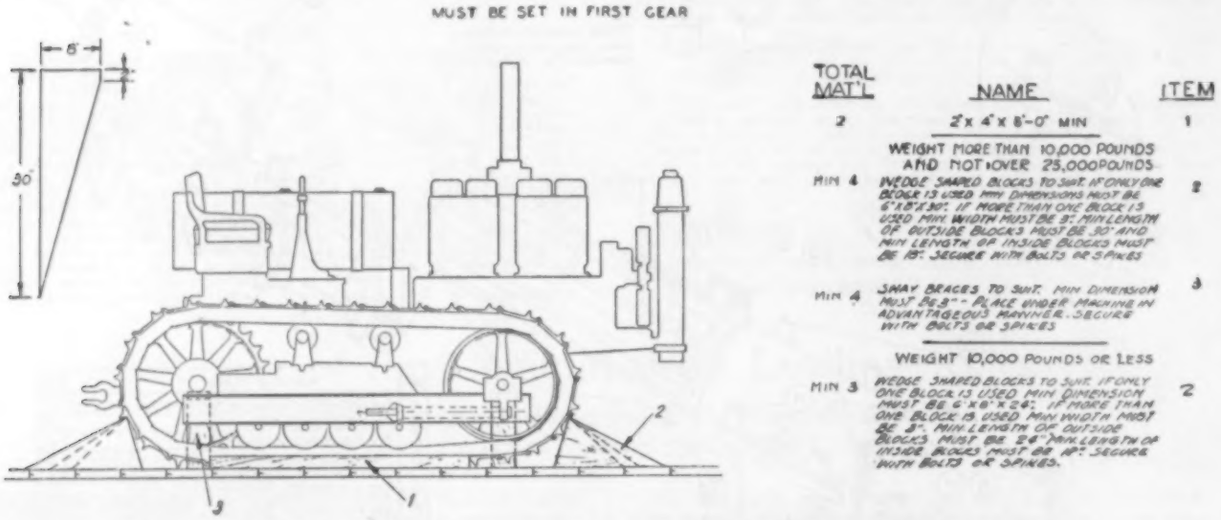
On cars with steel ends or steel plated ends, this total weight may be increased to 15,000 lb.

Explanation—This rule has been revised to eliminate end blocking on gondola cars with steel ends or steel plated ends where the total weight of lading does not exceed 15,000 lb.

RULE 255

Proposed Form—Gondola or flat cars: All cast iron pipe 24 in. or more in diameter must be loaded in pyramidal form. The ends of the bottom course must not be less than 18 in. from the end of the car, on flat cars, and 6 in. from the end boards on gondola cars. *The bell ends of the bottom course must be toward the end of the car.* The bell ends of the top course must be toward the center of the car and overlap the end of the course immediately below. *The bottom course must be so located on the car that the ends of the top course will fit neatly together. The bottom course must be securely blocked at both ends of each pipe with not less than 4 in. by 5 in. by 16 in. blocks, securely nailed to car floor with 30-penny cement coated nails and each of these end blocks must be backed up with two 2-in. by 4-in. by 12-in. cleats securely nailed to the car floor with 20-penny cement coated nails. The sides of each pile* must be securely blocked with not less than three blocks 8 in. long and of a height equal to one-quarter the diameter of the pipe, provided that blocking more than 10 in. in height will not be required. The blocks must be neatly fitted to the pipe, shouldered and beveled on the outside and secured against displacement. *The top course must be separated from the course immediately below by 2-in. by 4-in. soft wood strips as per Fig. 83.*

Explanation—This rule has ben changed to conform to the present method used by cast iron pipe shippers and it has been demonstrated that it makes a much better load.


MUST BE SET IN FIRST GEAR
6"
30"
2
3
1
TOTAL MAT'L
NAME
ITEM
2
2"x 4"x 8'-0" MIN
1
WEIGHT MORE THAN 10,000 POUNDS AND NOT OVER 25,000 POUNDS
MIN 4
WEDGE SHAPED BLOCKS TO SUIT. IF ONLY ONE BLOCK IS USED MIN DIMENSIONS MUST BE 6"x8"x30". IF MORE THAN ONE BLOCK IS USED MIN WIDTH MUST BE 9". MIN LENGTH OF OUTSIDE BLOCKS MUST BE 30" AND MIN LENGTH OF INSIDE BLOCKS MUST BE 18". SECURE WITH BOLTS OR SPIKES
2
MIN 4
SWAY BRACES TO SUIT. MIN DIMENSION MUST BE 8"- PLACE UNDER MACHINE IN ADVANTAGEOUS MANNER. SECURE WITH BOLTS OR SPIKES
3
WEIGHT 10,000 POUNDS OR LESS
MIN 3
WEDGE SHAPED BLOCKS TO SUIT. IF ONLY ONE BLOCK IS USED MIN DIMENSION MUST BE 6"x8"x24". IF MORE THAN ONE BLOCK IS USED MIN WIDTH MUST BE 9". MIN LENGTH OF OUTSIDE BLOCKS MUST BE 24" MIN LENGTH OF INSIDE BLOCKS MUST BE 18". SECURE WITH BOLTS OR SPIKES.
2

Manner of Loading Engines, Tractors, or Wagons or Similar Machinery of the Crawler Type

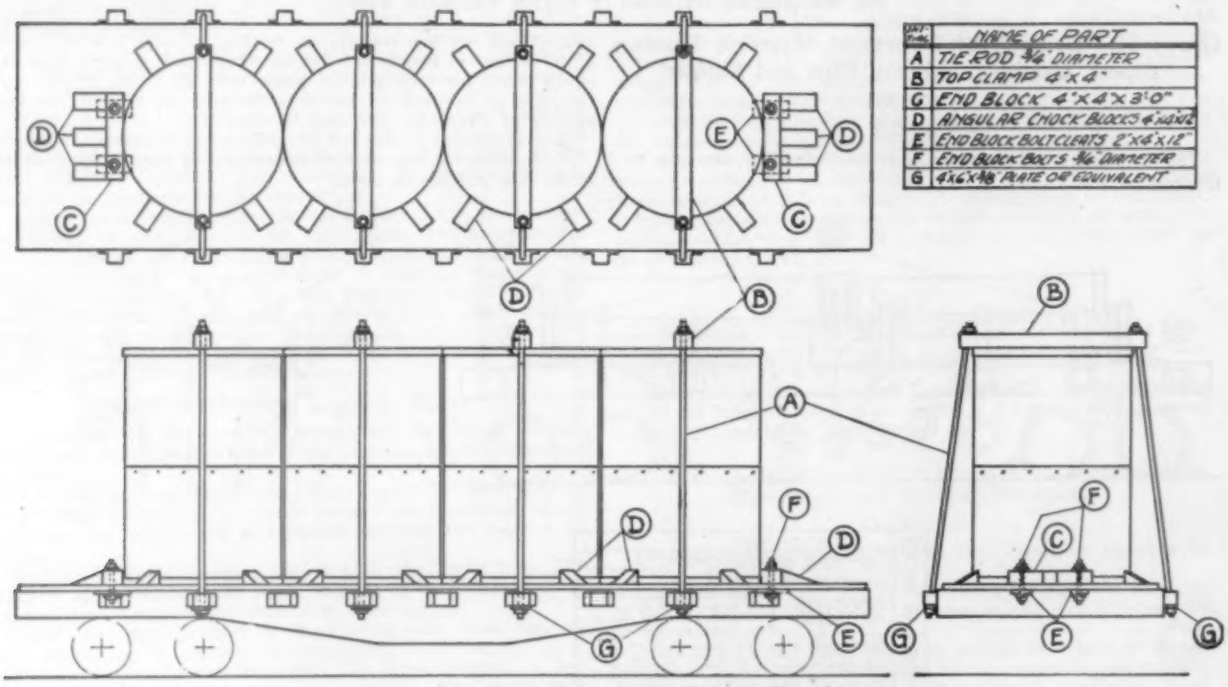

UNIT ITEM
NAME OF PART
A TIE ROD ¾" DIAMETER
B TOP CLAMP 4"x4"
C END BLOCK 4"x4"x3'-0"
D ANGULAR CHOCK BLOCKS 4"x4"x2'-
E END BLOCK BOLT CLEATS 2"x6"x12"
F END BLOCK BOLTS ¾" DIAMETER
G 4"x6"x⅜" PLATE OR EQUIVALENT

Fig. 101-G—Loading Tanks on End on Flat Cars

RULE 260-A, NEW RULE

Proposed Form—Mounted wheels may be loaded double decked on flat or gondola cars as shown in Fig. 85-A. The end blocking must be not less than 8 in. by 10 in. section in one piece full width of load, or made up of two pieces of hard-

wood of equivalent section, and each end block must be backed up with at least four 4-in. by 6-in. by 12-in. angular chocks securely nailed to the car floor with 30-penny cement coated nails. In addition to this, each wheel in the bottom tier must be blocked on both sides with 4-in. by 5-in. by 10-in. angular chocks securely nailed to the car floor with 30-penny cement coated nails, or each outside wheel must rest on metal saddles ⅝ in. by 3 in. by 18½ in. These saddles to be formed as shown in Fig. 85-A.

The third pair of wheels from the end in the bottom tier and the first pair from the end in the second tier must be tied together, using ⅞-in. by 4-ft. rods, threaded on both ends, and tie straps ¾ in. by 3 in. by 12 in. as shown in Fig. 85-A.

Journals, when between wheel flanges, should be protected with oak strips ⅝ in. by 2 in. for the length of the journal protected. These strips should be banded by two metal bands of No. 20 band iron, 1¼ in. wide or equivalent, nailed to each stick as shown in Fig. 85-A. Any other effective method of protecting the journals from being scarred will be acceptable.

Explanation—This new rule has been proposed by one of the large railroads. The proposed method will permit handling

Group III. Loading of Mining Cars, Engines, Boiler Shells, Machinery, Derricks and Similar Commodities

Rule 301

Pages 175 and 176. It has been recommended to revise the heading, Page 175, to read as follows: *Loading of mining cars, dump cars, auto trucks and similar vehicles on or off trucks, on open cars,* Also add, the following paragraph to Rule 301, Page 176: *The methods specified in Fig. 98-A and 98-B will be accepted as alternatives in securing bodies loaded without trucks underneath them.* Marginal reference to this paragraph to read: *Bodies not on trucks.* New Figures 98-A and 98-B to be added to the present book of rules.

Explanation—These methods have been tried out in service and have proven safe and satisfactory.

Rule 302-A

Proposed Form—Small diameter tanks when more than one tank can be placed longitudinally (side by side) on flat or on

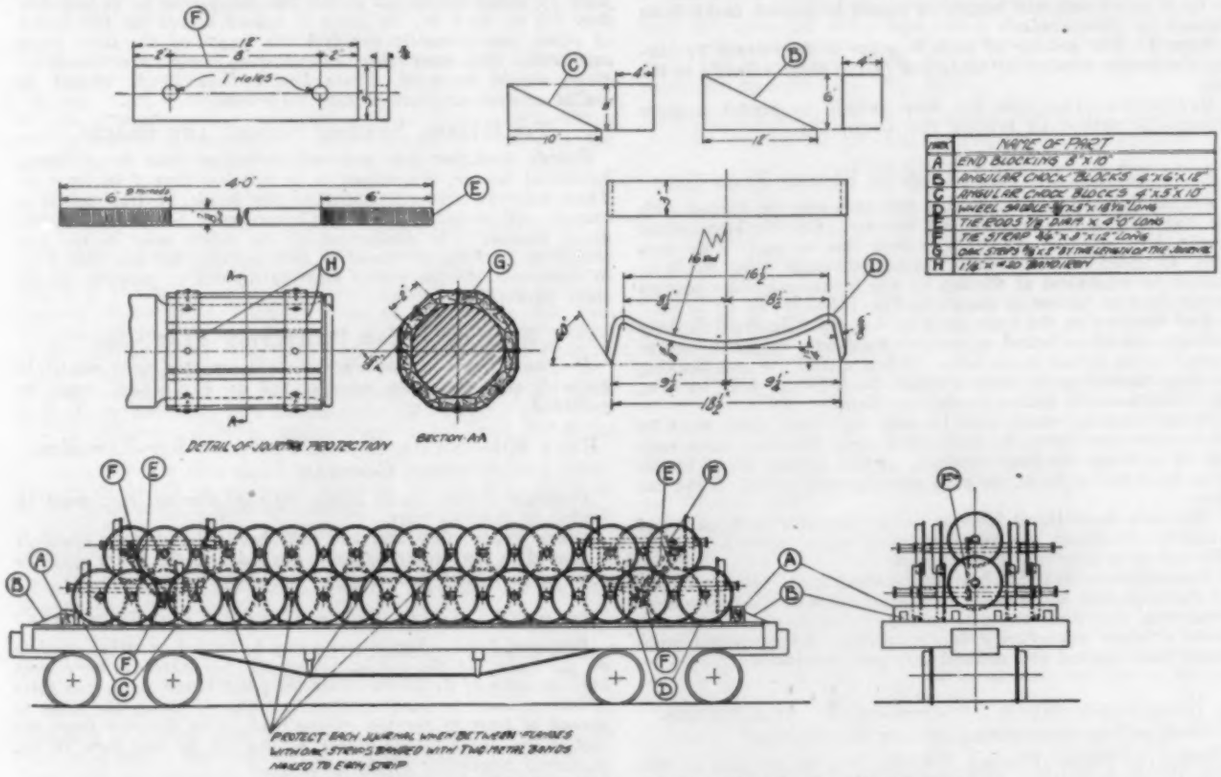

NAME OF PART
A END BLOCKING 8"X10"
B ANGULAR CHOCK BLOCKS 4"X6"X18"
C ANGULAR CHOCK BLOCKS 4"X5"X10"
D WHEEL SADDLE 3"X8"X4'-8" LONG
E TIE RODS 7/8" DIAM. X 4'-0" LONG
F TIE STRAP 3/4" X 3" X 12" LONG
G OAK STRIPS 5/8" X 2" AT THE LENGTH OF THE JOURNAL
H 1 1/4" X NO. 20 BAND IRON
4'-0"
DETAIL OF JOURNAL PROTECTION
SECTION AA
PROTECT EACH JOURNAL WHEN BETWEEN FLANGES WITH OAK STRIPS BANDED WITH TWO METAL BANDS NAILED TO EACH STRIP

Fig. 85-A—Manner of Loading Mounted Car Wheels, Double Decked

of a greater supply of wheels in one shipment from wheel shops to repair tracks.

Rule 266

Proposed Form—The bracing at the ends of piles toward the center of the car shall consist of one upright piece, 2 in. by 4 in. against the end of the pile, backed up by one upright piece 2 in. by 8 in. or *two,* 2-in, by 4-in. pieces against the side of the car, the uprights to extend not less than 4 in. above the top of the pile, and be securely nailed to the side of the car *with cement coated nails* as per Figs. 90 and 90-A. All longitudinal end bracing must be substantially secured to posts and braces and one piece 2 in. by 4 in. in each brace must extend across the doorway, to the load at the other end of the car. *The top longitudinal end braces must be held against the sides of the car by three cross braces 2 in. by 4 in. in section, the length to be determined by the distance between the side walls of the car. These cross braces must be of a driving fit.*

[The remainder of the rule is unchanged.—Editor]

Explanation—This rule has been revised requiring cross braces for the purpose of holding the end longitudinal braces from pulling away from the side walls of the car. Inspection at destination has developed the fact that these cross braces are a betterment.

gondola cars shall be loaded *two,* three, four, five, six or more tanks per pile as per Figure 101-A.

Two tanks may be loaded longitudinally (side by side) on flat or on gondola cars. When loaded on flat cars the side blocking must be backed up with 4-in. by 5-in stakes, the inside face of which extend not less than 14 in. above the car floor vertically. When the width of the load will not permit the vertical application of 14-in. side stakes, the specified side blocking must be used and in addition one rod or band centrally located will be required for tanks not more than 12 ft. in length and two rods or bands will be required for tanks more than 12 ft. in length.

Tanks loaded three per pile in pyramidal form must be secured with two rods or bands on end piles and one rod or band on intermediate piles; except when the diameter of the top tank exceeds the diameter of the bottom tanks or where piles made up of tanks more than 12 ft. in length exceed the width of the car floor, at which time two rods or bands must be used on intermediate piles.

Tanks loaded four and five per pile must be secured with three rods or bands on end piles and two rods or bands on intermediate piles. Tanks loaded six or more per pile in pyramidal form must be secured with two rods or bands per pile.

The rods must be at least ¾ in. in diameter and the bands

must be of equivalent strength with suitable provisions to secure to the side of the car, stake pockets or floor with ¾-in. nuts and washers or cleats; the threaded ends to be riveted over or checked to prevent the loss of nuts.

Each layer of tanks, when not loaded in pyramidal form must be separated by at least two, 3-in. by 4-in. bearing timbers having 4-in. by 6-in. chock blocks spiked to the top and bottom of each bearing timber.

The side blocks on the floor when *tanks are* loaded on gondola or flat cars must be 4 in. wide by 6 in. high and applied as shown in Fig. 101-A for each pile. The end blocking *at the floor* must be applied at the outer end of the end piles. *This blocking should be* 4 in. by 4 in. full width of load at the floor securely *spiked or bolted to the car floor with 60-penny cement coated spikes or two, ¾-in. bolts. When spiked, the end blocking must be backed up by three angular chock blocks 4 in. by 4 in. by 12 in. securely spiked to the car floor. When bolts are used 2 in. by 4 in. by 12 in. cleats must be used under the floor.*

Tanks when not loaded in pyramidal form must have tanks in the upper layer directly above those in lower layer.

Note 1.—Riveted tanks that may be damaged by coming in contact with each other must have filler pieces not less than 1 in. by 4 in. of sufficient length, so placed to protect tanks from damage by rivet heads.

Note 2.—*The number of piles in a car is determined by taking the largest number of tanks end to end longitudinally in the car.*

Explanation—This rule has been revised to permit a more economical method of bracing this commodity.

Rule 302-C—Tanks Loaded on End of Flat Cars

Proposed Form—Tanks having flat ends may be loaded with the flat end on the floor of the flat car. On the longitudinal center line of the car. They must be secured with two rods threaded at each end passing through 4-in. by 4-in. clamps or equivalent at the top of the tanks and stake pockets or the floor at bottom as shown in Fig. 101-G.

End blocking at the floor must be 4 in. by 4 in. by 3 ft. long securely spiked or bolted to the car floor with 60-penny cement coated spikes or two ¾-in. bolts. When spiked, the end blocking must be backed up by three angular chock blocks 4 in. by 4 in. by 12 in. securely spiked to the car floor.

When bolts are used, 2-in. by 4-in. by 12-in. cleats must be used under the floor. In addition to end blocking, each tank should have side blocking consisting of two angular chock blocks 4 in. by 4 in. by 12 in. on each side securely spiked to the car floor.

The rods must be at least ¾ in. in diameter with nuts and washers or cleats; the threaded ends to be riveted over or checked to prevent the loss of nuts.

Explanation—This rule has been framed at the request of one of the large tank shippers on account of some of their customers requesting that these tanks be loaded on flat cars, which affords them a better opportunity for unloading. Experimental shipments have proved this method safe and satisfactory.

New Rule—Rule 305-A—Loading of Engines, Tractors and Similar Machinery

Proposed Form—Engines, tractors, wagons or similar machinery of the crawler type loaded lengthwise on cars must be secured, depending on the weight, as outlined in Fig. 105-D. Any unit equipped with pivoted wheels for steering shall have these wheels secured against turning with straps as shown in Fig. 105-B and blocks 3 in. by 4 in. must be spiked to the car floor outside of each wheel as shown in Fig. 104. Shipments more than 10 ft. high above the car floor must be substantially secured against tipping with suitable rods, cables or wires.

Explanation—The above rule is written to more fully cover requirements for such loading.

Group IV. Loading of Concrete Culvert Pipe, Brick, Stone, Building Tile and Similar Products

Rule 400—Concrete Loaded on Flat Cars

Proposed Form—Pipe, with bell end loaded lengthwise of the car, must be secured as per Fig. 109. Pipe, not to exceed 48 in. in length and diameter, loaded crosswise of the car, must be secured as per Figs. 109-A and 109-B. If equipped with the bell on one end, the ends must be alternated. Either end stakes with 2 in. plank or 6-in. by 8-in. or built-up equivalent, minimum length 6 ft. may be used for end blocking. When loaded end for end, the bell end must be located outward toward the side of the car, and suitable strips must be placed on the edge and secured between the pipe to prevent end damage. Pipe loaded on end must be secured as per Fig. 110, and where the diameter exceeds 48 in., the pipe may be placed on the floor with the bell end upward.

Explanation—This rule is revised at the request of one of the large concrete pipe shippers, this method of bracing being more economical than the requirements of the present rule.

Rule 401—Stone Not Specified and Stone Wider Than Car

Proposed Form—All stone *for which no specific method for loading has been provided must be secured with proper side and end protection. Stone extending beyond the outside of the car, preventing the use of stakes, must be secured with four strands of ⅛ in. wire or metal straps of equivalent strength. The wiring or straps must be located approximately 12 in. from the ends of the stone, securely attached to stake pockets on both sides of the car.*

Rule 402—Bearing Strips Between Floor and Stone

Proposed Form—Sawed stone must be separated from the floor by sound hardwood strips, the dimensions to be not less than 1½ in. by 3 in., the same to extend across the full width of stone, approximately one-fifth the length of the stone from each end. Not more than two bearing strips per length of stone should be used. Stone longer than 10 ft. should be loaded as near as possible over the trucks.

Tie Boards, Stakes, Wedges and Braces

Boards used for side and end protection must be of sound hardwood lumber, dimensions to be not less than 1 in. by 6 in. They must be securely nailed to the inside of the stakes or braces. All stakes, wedges and braces must be of sound hardwood lumber. The dimensions of the stakes must be not less than 3 in. by 5 in., or round or split saplings not less than 4 in. in diameter. All the stakes must be tapered to properly fit the stake pockets.

Rule 403—End Protection Flat Cars

Proposed Form—When cars are not equipped with end stake pockets, end protection as specified in Fig. 112-C must be provided.

Rule 404—Small Stone, Fluxing, Rip-Rap, Etc. Gondola Cars

Proposed Form—Small stone, rip-rap, fluxing, etc., must be loaded in gondola cars.

When larger stone that can fall through drop door openings is loaded in cars equipped with drop doors, the doors must be covered over with boards.

Rule 405—Sawed Stone, Gondola and Flat Cars

Proposed Form—Sawed stone may be loaded on either gondola or flat cars. If the top stone of the tier extends more than three-fourths of its height above the gondola car sides, two pairs of stakes must be used with each length of stone, the same to extend at least to the top of the load. The distance from the end of the stone to the stakes should not be less than 12 in., measured lengthwise of the car.

Rule 407—Small Resawed and Planed Stone—Flat Cars

Proposed Form—Small resawed and small planed stone should always be loaded lengthwise of car, and two *pairs of side* stakes *must be used for* each tier. The distance from the end of the stone to the stakes must be not less than 12 in. measured lengthwise of the car. If on account of the location of the stake pockets, or for any other reason, this distance cannot be obtained *side* boards *to properly protect the stone must be securely nailed to the inside of the stakes. When stone sawed on four sides are loaded on flat cars in two or more tiers over 12 in. in height, the stakes must extend not less than 4 in. above the top of the load. Each pair of stakes must be tied together by nailing 1-in. by 4-in. boards on both sides of them, across and close to the top of the load, secured with not less than three ten-penny nails. Two wrappings equal to four strands of good ⅛-in. wire or metal straps of equivalent strength may be used, the same to be wrapped around each stake and tightly secured across and close to the top of the load.*

Large resawed and planed stone (each of which contains 20 sq. ft. of bearing surface or more resting on the car floor), *piled in tiers,* should be loaded the same as stone sawed on two sides.

All resawed and planed stone, both large and small, *in addition to the two pair of side stakes, and end protection specified*

in Rules 402 and 403, care must be used in providing proper protection to prevent the stone from shifting.

Rule 408—Curbing and Stone Sawed on More Than Two Sides—Flat Cars

Proposed Form—When curbing and stone sawed on more than two sides *are* loaded lengthwise *on flat cars, two pairs of side* stakes *must be used, the same* to extend to at least two-thirds the height of the outside stone. The distance from the end of the stone to the stakes *must* not be less than 12 in. measured lengthwise of car: *If on account of the location of the stake pockets, or for any other reason, this distance cannot be obtained,* boards to properly secure the stone must be securely nailed to the inside of the stakes. Standard end protection as specified in *Rules 402 and 403 must* be provided.

If rough-quarried curbing is loaded flatwise in tiers *two pairs of stakes for each length of stone and end protection as specified in Rules 402 and 403 must be provided.*

Rule 409—Loading of Dressed Stone—Gondola and Flat Cars

Proposed Form—On account of the various sizes and shapes of dressed stone, no specific rules can be made governing its loading. Such stone, however, may be loaded on flat, gondola or box cars, depending upon the *sizes* of stone and facilities for unloading at destination. When loaded on flat cars the *specified* side and end protection must be *provided.*

Rule 410—Large Mill Blocks or Other Large Stone Having Regular or Irregular Surfaces

Proposed Form—Mill block loaded lengthwise or obliquely on car should be protected on the sides and ends by cleats not less than two by four in, in section, extending at least three-fourths of length or width of stone or by not less than two wedges 3 in. by *5 in.* on sides and 4 in. by 4 in. on ends, wedges to be *from 12 in. to 14 in.* long and securely nailed to floor of car at right angles to stone.

[The remainder of the rule is unchanged except for the addition of the following note at the end.—Editor]

Note. Change wording under Figs. 112-A and 112-B as follows:

Cleats not less than 2 in. by 4 in. in section at least three-fourths of length or width of stone or wedges 3 in. by 5 in. by 12 in. to 14 in. to prevent shifting of load crosswise, wedges 4 in. by 4 in. by 12 in. to 14 in. to prevent shifting of load lengthwise.

Explanation—Rules 401 to 410 inclusive, governing the loading of stone, have been revised to simplify the rules for the best interests of all concerned.

Group V. Loading of Automobiles, Trucks and Trailers on Freight Cars

Rule 521

It was suggested that in this rule the phrase "tie-down" be used in place of the word "rope." Thus second paragraph of Item (b) would read: "If wire wheel—pass tie-down over felloe and fasten on inside and outside as above." Third paragraph would read: "If solid wheel—tie-down may be passed over the hub."

Explanation—This rule is modified to permit the placing of tie-downs over the axles of automobiles having solid wheels.

Rules 561, 562, 563, 564 and 565

It is proposed to modify these rules by adding the following note after Rule 565: "Any arrangement of equal efficiency to that Specified herein will be accepted as an alternative." The rules and the note referred to are to be marked with an asterisk (*).

Explanation—These rules are modified at the request of several of the large automobile shippers, so that anti-creep devices may be used instead of the required side bracing.

Supplement

Alternate Method of Loading Wrought Pipe Less Than 24 in. in Diameter in Gondola Cars

Rule 250-A. There must be not less than three pairs of 4-in. by 4-in. hardwood stakes to each pile of pipe 30 ft. or less in length, and four pairs of 4-in. by 4-in. hardwood stakes to each pile when the pipe is more than 30 ft. in length; all stakes extending sufficiently above the load to tie together with wire or bands.

When pipe extends 3 ft. or less above the car sides each pile of pipe must be securely tied into a bundle with one wrapping of 5/16-in. diameter wire, or band of equivalent strength, at each stake location. Each pair of stakes shall be held together of the top with two separately tied wrappings of 5/16-in. diameter wire, or band of equivalent strength.

When pipe extends more than 3 ft. above the car sides, opposite stakes must be pulled together and tied intermediately with two separately tied wrappings of 5/16-in. diameter wire, or bands of equivalent strength, after the pipe has been loaded to the top of the car sides. These intermediate tie wires should be as close to the top of the car sides as practicable, but not over 18-in. above the top of the same. The pipe loaded up to this point must be securely tied into a bundle with one wrapping of 5/16-in. diameter wire, or band of equivalent strength at two locations, each 12-in. toward the center of the car from the outside stakes. The remainder of the load should be placed on the intermediate wire or bands, and must be securely tied into a bundle with one wrapping of 5/16-in. diameter wire, or band of equivalent strength at the same locations as the lower unit of the load.

The upper and lower units must then be tied into a bundle with one wrapping of 5/16-in. diameter wire, or band of equivalent strength at three locations, one at the center an done 4 ft. from each end, tying the entire load into a single bundle.

Opposite stakes must be tied together at top with two separately tied wrappings of 5/16-in. diameter wire, or bands of equivalent strength. See Fig. 81-H.

Alternate Method of Loading Wrought Iron Pipe 14 in. to 26 in. Inclusive in Diameter in Pyramidal Form

Rule 250-B. When the load extends more than 3 ft. above the car sides the upper portion may be loaded in pyramidal form, in which case the base line of the lower tier of pipe in pyramid must not be more than 4 ft. 6-in. above car floor.

There must be not less than three pairs of 4-in. by 4-in. hardwood stakes to each pile of pipe 30 ft. or less in length, and four pairs of 4-in. by 4-in. hardwood stakes to each pile when the pipe is more than 30 ft. in length. All stakes must extend to not less than the top of the pipe forming the base tier of the pyramid.

Before the base tier of the pyramid is placed on the car the lower unit of the load must be securely tied into a bundle with one wrapping of 5/16 in. diameter wire, or one band of equivalent strength at two locations, each 12 in. toward the center of the car from the outside stakes. The load must rest on three wooden strips not less than 1 in. by 4 in. placed on the floor of the car and equally spaced.

Each pair of stakes must be securely tied with two separately tied wrappings of 5/16 in. diameter wire, or bands of equivalent strength before the lower tier of the pyramid is placed on the car. Three soft wood spacing strips 2 in. by 4 in., equally spaced, must be placed between the base tier of the pyramid and the top tier of the lower unit. These spacing strips to have chock blocks 3 in. by 4 in. by not less than 4 in. long, securely nailed to them at each side of each pipe in the base tier of the pyramid, and on the bottom sides of the strips at each end bearing against the outside pipe of the tier below.

The remainder of the load is to be placed on the car in pyramidal form, placing small strips such as common building lath, between each tier at no less than two locations. The unit forming the pyramid is to be securely tied into a bundle with one wrapping of 5/16 in. diameter wire, or one band of equivalent strength at the same locations as the lower unit.

The upper and lower units must then be securely tied together

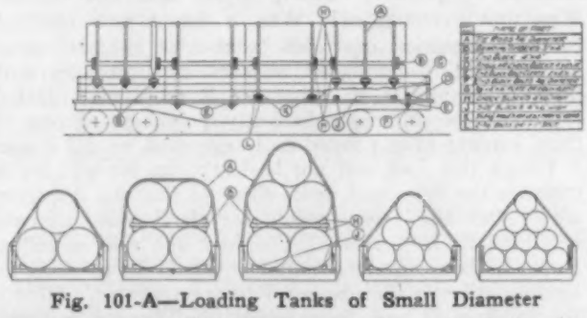


Fig. 101-A—Loading Tanks of Small Diameter

with one wrapping of 5/16 in. diameter wire, or band of equivalent strength at three locations; one at the center and one 4 ft. from each end, tying the entire load into a single bundle. See Fig. 81-I.

Note.—All wire or bands must have a tensile strength of at least 100,000 lbs. per sq. in.

The report is signed by Samuel Lynn (Chairman), superintendent rolling stock, Pittsburgh & Lake Erie; R. H. Dyer,

general car inspector, Norfolk & Western; E. J. Robertson, superintendent car department, Minneapolis, St. Paul & Sault Ste. Marie; G. R. Lovejoy, master mechanic, Detroit Terminal Railway; T. O. Sechrist, assistant superintendent machinery, Louisville & Nashville; C. J. Nelson, chief inspector, Chicago Car Interchange Bureau; R. B. Rasbridge, superintendent car department, Reading Company, and G. A. Marlow, chief car inspector, Pennsylvania.

Discussion

Mr. Brazier: We want the rules so that every inspector can hold them up and say, "Here is the rule. We cannot accept this unless the cars are loaded according to the rules." That helps the inspectors. Our rules of interchange, as we all know, are our foundation and with these two rules—Interchange and Loading— together it means the safe movement of cars, particularly on double track roads. There is not care enough taken in loading. At outside points, where there may be some small shipper, he does not know the rules, and the result has been a great many accidents caused by improper door protection.

Mr. Tatum: A sub-committee was appointed to go over a recommendation that I made last June, at Montreal regarding these rules. Five reasons were given by the sub-committee why my recommendation was not considered practical. Still I believe they are practical and are needed. There is an opportunity to improve those rules.

The committee says: "First. In applying the general rules to each rule pertaining to a particular commodity, it would require an enormous lot of duplication of paragraphs and figures showing the manner of loading."

When an inspector goes out to inspect a car and he has to take a book like this and refer to a number of cross references, he has some job to know that the car is correctly and properly loaded in accordance with the requirements. The shipper loading the car has the same condition to meet. That being true, the rules should be written so that he could open a page concerning the loading and find all the information there that he would need to load the car correctly.

I would like to ask the sub-committee how far it went into its investigation? Did they ask how many loads were being delivered at interchange points that were held up because they were not loaded in accordance with the requirements of these rules?

Secondly, I would like to know how many cars have been loaded that were not in accordance with these rules, and gave trouble either by breaking down, derailment or possibly causing injury and loss of life. Was that investigated? Was it found how much it cost for detention of trains because of trouble caused by load not being placed on cars in accordance with these rules, and if so, what did it represent? Did it represent the difference between the increased cost of these loading rules printed as I suggested, or did it not?

I hope this idea will not be lost; that we will try to improve the rules and make them so that the inspector, who, after all, is responsible for the loading of cars, will load them correctly. Consider one rule as an example of how simple a matter it would be to print the loading rules in the manner I have suggested. Here is the loading of ties, fence posts, and similar material. If we had cross references, it would refer you to five different pages in the book. All this could be printed on one page, and if a smaller book, pocket size, were desired, it could be put on two, three or more consecutive pages. What we desire is safety.

R. H. Dyer (N. & W.): We went into the matter very thoroughly as we saw it, perhaps not from the standpoint that Mr. Tatum has raised here, that the question of loads passing through interchange are not loaded in accordance with the rules. It would seem to us that it would make little difference how the rules are printed, or in other words to change the form of rule would not in any way improve the inspection of the car. The plan suggested is entirely feasible but the committee, looking at it from the standpoint as indicated in the report, did not feel justified in carrying out the recommendation.

Mr. Tatum: You have not answered any of the questions I have asked. Apparently you have made none of the investigations that I suggested. The committee was honest in what it did, and I want to give them credit for writing just what they thought, but the fact remains that there was a suggestion which represents safety and they should have been gone into thoroughly.

The Baltimore & Ohio receives freight from many railroads. We know not only what happens on our road, but what is happening on the other roads that deliver cars to us. We are constantly and repeatedly tying up cars to adjust the loads to make them safe because they are not loaded in accordance with the loading rules. We have had telegraph poles go off and sideswipe trains and penetrate two cars in length because they were not loaded in accordance with the rules; we have had stones go off cars and drop upon the right-of-way between the tracks; we have had them sideswipe and distort bridges.

Mr. Kleine: I do not think the question as to whether all details of the rules are under one heading or under a number of headings with references thereto has anything to do with safety. In the first place, the inspector is supposed to know his loading rules before he goes out and inspects a load. I have been connected with the Loading Rules for a number of years, and I have had a good deal of experience with the shipper, and I want to say those that have not had that experience would be surprised at what detailed knowledge shippers have of the rules, where they are, on what page, and what reference to make. I therefore do not think it is a question of safety at all. It is a question of the arrangement of the rules.

The present arrangement of the rules, aside from the points brought out by the committee, in which I concur, is that certain fundamentals are placed together in the rules, such as overhang of the load, the width of the load at the overhang, location of bearing pieces, and the maximum widths on double and triple loads. If they were scattered all through the rules, we should think that would be a detriment rather than a help. You have the one rule to study, and if you know that one rule you can apply it to any commodity, whether that is logs, steel loading, or turn-tables. I therefore concur completely with the committee that the change is undesirable. The more rules that are represented under different headings, the more confusion there is and when you make a change in any particular rule you must reprint the whole book.

I want to touch on one thing. The Loading Committee meets with not only one set of shippers, but with a large number of shippers. They have a constant job all the year round and it is an arduous task. I think our loading rules today are in better shape and cover safety as far as it can be covered, and I want to say for the shippers that universally shippers comply with the loading rules. Take the steel shippers in the Pittsburgh steel district. In fact, they are the leaders in loading rules so far as steel

is concerned, and that also applies to the steel shippers in Chicago and around Youngstown. The Automobile Loading Rules Committee confers with our committee once a year.

I move that the report of the committee be accepted and the details referred to letter ballot.

K. F. Nystrom (C. M. St. P. & P.): In connection with the alternate method of loading wrought iron pipes, Rule 250B. The Milwaukee, together with one of its shippers, originated this type of loading. The Loading Rules Committee has made a study of it, and the chairman made reference to two-stake and three-stake loading. I would like to point out the difference in the two. The rule as it now stands calls for three stakes for certain lengths of pipes and four stakes for others—on each side of the car—each stake to be a minimum of 4 in. by 4 in. The Milwaukee has shipped a number of loads having only two stakes on each side, 4 in. by 6 in. We consider this a safe load for pipes of 30 ft. and over, because a 4 in by 6 in. stake is stronger by 50 per cent than 4 in. by 4 in.

The Loading Rules Committee has consented further to investigate this type of loading. During the coming year test loads will be made, and probably by the next convention this rule may be modified, if the committee can be satisfied that a two-stake load is safer than a three-stake load.

Mr. Tatum: Mr. Nystrom suggests that we put a load on a car and protect it with two stakes. Has he ever given thought to what would happen if the load should shift?

S. Lynn (P. & L. E.): Mr. Nystrom has touched on the matter that brought about this discussion on wrought iron pipe loading. We have representatives of some of the pipe manufacturers in the hall today, and probably they could give us a word that would show that the Loading Rules Committee has taken every precaution to see that the loads were put up in the proper manner.

Mr. Nystrom: I would like to inform Mr. Tatum that nothing will happen if one stakes breakes. We tie those loads with a special wire which is 50 per cent stronger than any wire used heretofore, and we know it is safe.

Mr. Lynn: Mr. Nystrom is advocating a two-stake rule. I have no argument as to the strength of the 4 in. by 6 in. stake as compared with the 4 in. by 4-in. stake, but I take the position that three stakes on a 30-ft. load of pipe distributed in the length of that pipe is a safer load than a stake at each end of 30-ft. pipe. Neither Mr. Nystrom nor any of the committee can tell what is at the center of that stake, and we do know that pipe will shift longitudinally in transit. On our present loading method, we have 24 and 30-ft. lengths of pipe, and our records will show that they have shifted lengthwise and have left the car and dropped on the right of way. On the unit-tie load I also happen to know that the unit-tie load has shifted longitudinally, that some of the tie wires have broken, and that the end stake has pulled out from its original location. If a pipe should get by the stake, you have nothing then but a stake at the other extreme end. Three stakes with one in the center will do more to keep pipe in its original position. That is why we are insisting on the three-stake load.

Mr. Morris (National Tube Co.): I am sorry that Mr. Tatum included pipe with those commodities that spilled over the right-of-way, because we have always taken pride in our loading. We spend between $350,000 and $400,000 each year for dunnage alone in the interest of safety. We have spent during the past 20 years $75,000 experimenting with various methods of loading.

I consider this two-stake proposition one of the worst that has ever been brought to the attention of this committee. Someone said that over 1,600 cars of pipe had been shipped using the two-stake method. Did the roads have the permission of this committee to send those cars out over the line with two stakes in direct violation of the rules?

Why do you cut down from four or five stakes to two stakes? To save a few dollars, because you save so much per stake. If any two-stake proposition should go through or be approved by this committee we would not be a party to it.

Mr. Nystrom: The question of cost is not involved. There is exactly the same number of board feet in each case, and actually it costs more to have 6-in. by 4-in. stakes than 4-in. by 4-in., because it is selected lumber. It is purely a matter of safety, and if three stakes are necessary, I would be in favor of having them 4 in. by 6 in. It is not a matter of cheapening the load, but to make it safe.

T. J. O'Donnell (Ch. Insptr., Buffalo, N. Y.): Out of deference to Mr. Kleine and Mr. Lynn and their associate member of the Loading Rules Committee, I feel it my duty as a member of this Association, and working for many of you officials, to say that the Loading Rules Committee have done so well in the last ten years by their unprecedented meetings, suggestions, that we have greatly reduced the bad order cars and improper loads in our district.

Mr. Kleine: I want to second what Mr. Morris had to say. Mr. Townsend was the original pipe loader and Mr. Townsend gave us a safe load. He never quibbled for one minute on the amount of material that was necessary to put on a car, insofar as safety was concerned.

I understand that one road has sent out 1,600 trial loads, not loaded in accordance with the loading rules. They were accepted and passed over several railroads. In the first place, the shipper violated the loading rules and the railroads who accepted those loads also violated the loading rules.

It is necessary for the Loading Rules Committee to make shipments or trial loads, after they have passed upon the method, in order to try out those loads in service, but the committee has never, in its history, sanctioned any such temporary loading or approved of them. The Loading Rules are a part of the interchange rules and it is a violation of the interchange rules plus the loading rules to send out loads not in accordance with the rules.

I might say that that particular question came up before the General Committee at its meeting on Tuesday and the matter will be followed to a conclusion with the executives of the railroads who violated those instructions. We must back up our Loading Rules Committee and we must not pass through interchange loads loaded contrary and in violation of the loading rules.

Chairman Smart: The motion before you is that this report be accepted and submitted to letter ballot.

(*The motion was seconded and carried.*)

Report of the Committee on Tank Cars

Welding Restrictions Continued——Important News and Revised Specifications——Joint Report on Bottom Outlets

In its report to the association in 1927, the Tank Car Committee announced its conclusion that the specifications of the association, effective March, 1, 1926, should be revised in respect of tank cars to be built after July 1, 1927, which would be equipped with tanks complying with the interstate commerce commission specifications. This revision has not yet been completed because of certain undetermined details of procedure by the carriers under the interstate commerce commission specifications. It is anticipated that all pending questions in this matter will shortly be decided, which will permit the revision of the specifications to be made. This revision is to be undertaken by a sub-committee, consisting of Messrs. Lindner, Cooper and the chairman.

Top Loading and Unloading Devices

Mention was made in the last annual report of the development of devices designed for top loading and unloading without opening the dome closure. this being accomplished by the installation of pipes extending to the bottom of the tank from a recessed fitting enclosed in the dome opening. The upper portions of these pipes are provided with suitable valves and with means to permit the attachment of loading and unloading pipes.

The committee has been favorable to the extended use of these devices under suitable restrictions concerning their application, which would avoid damage to the pipes and fittings in accidents involving overturning of the tanks. Interest on the part of the shippers, however, was stimulated by apparent economies realized through the possibility of loading cars under pressure, thereby avoiding losses of inflammable vapors.

Tank with Lock Bar Joints

In its earlier reports, the committee has made reference to the construction of a tank with so-called lock bar joints. This car is still in service in the transportation of non-inflamamable liquids, and no reports have thus far been received indicating the development of defects in the joints.

The car will be continued in service and further reports submitted.

Tank Heads

The sub-committee apointed to consider the proper form for tank heads in order that the design may present maximum strength and freedom from concentrated stresses, has accumulated considerable data and reports progress in its investigation.

It is anticipated that with the co-operation of the various builders of tank cars, a satisfactory solution of this problem will be reached at an early date.

The sub-committee engaged in this investigation is composed of messrs. St. Clair, Lindner, Smith and Tiley.

Autogenous and Electric Welding

There is evidence of increasing interest in tanks welded by processes other than the hammered or rolled water gas method now permissible under the specifications for class 105 tanks. In the opinion of the committee, the existing restrictions upon the use of autogenous and electric welding processes should be continued, because of variations in practices both in tank car construction and repairs, and also because of differences in the effectiveness of welding operations as performed under varying repair track and railroad shop work.

The committee is desirous, however, that its influences may be employed in the advancement not only of the design, but the construction of tanks, and, recognizing that progress in the application of autogenous welding to tank construction may be such as to warrant the use of these processes under appropriate restrictions, and in order that the subject may be studied to the best advantage and without interruption by the routine duties of the committee, a sub-committee for investigation of this matter has been appointed. The members of this sub-committee are Messrs. Smith, St. Clair, Beaghen, Cooper and Winter. A meeting of this sub-committee has been held and the scope of the work generally determined.

Pending the results of this investigation, in the opinion of your committee, no welds should be made in the tanks of Class 105 cars, except by the water gas process, and no welds should be made in the repairs of pitted and corroded sheets.

New Specifications

The specifications for the Class V cars, effective January 1, 1918, required substantially greater strength in the plantes than is necessitated by the pressures of the compressed gasses, which under the regulations of the interstate commerce commission, may be transported in cars of this class. It is proposed, therefore, that the calculated fiber stresses shall be based on a maximum limit of 17,500 lb. per sq. in. at a pressure of 300 lb. per sq. in., instead of 500 lb. per sq. in. as heretofore specified for cars of this class.

In addition to this provision, it is proposed that the form of the tanks shall be either spherical or cylindrical, as may be desired. The revised specification will be known as "Shipping Container Specification No. 105-A-300," and is presented herewith as Appendix "A" of this report. This specification is offered for approval by letter ballot.

The transportation of nitric acid has generally been made in relatively small quantities, and largely in carboys. In order that this commodity may be transported in larger volume, your committee has been requested to approve the construction of a special nitric acid tank, following in general the requirements of specification No. 103, except that the plates and rivets will be made of a metal having properties resistant to the action of nitric acid. Such material has been found to be chrome iron, specifications for which have been developed and presented for consideration to the Committee on Specifications and Tests of Materials as proposed standards of the Association. Specifications for these tanks (I. C. C. 103-C), are presented herewith as Appendix "B" of the report, and offered for approval by letter ballot.

Revisions in Existing Specifications

Subject to approval of proposed specifications for the class 103-C and 105-A-300 cars, the numbers of these tanks will be required to be inserted in the general paragraphs of the specifications covering the issuance of certificates and the tests of tanks and safety valves. Subject also to appropriate action by the association, these revisions will be included in the proposed letter ballot covering the specifications and other amendments thereto specifically mentioned.

Specification 104-A, Section 20, Paragraph (e) and 105, Section 15, Paragraph (e).

On recommendation of the Tank Car Committee, it is proposed to eliminate the stenciling on both sides of the valve protecting housing and require that the mark be stenciled on the jacket immediately below the dome platform and directly behind the ladder or ladders, if there is a ladder on each side of the tank. The letters, figures, and stenciling are otherwise to be the same as now provided.

Shipping Container Specification No. 105, Section 6 (c):

Representations having been made of the desirability of testing the metal covering over the rivets on the inside of the tanks, it is proposed to modify Section 6, Paragraph (c), as follows: "All rivet heads on the inside of the tank must be calked, and then must be covered by a metal cover fused to the tank by electric welding. The shell of the tank under the metal covering must be provided with a hole to permit an air pressure test, and after test has been made and the covering and the rivets are found to be tight against leakage, the hole in the shell must be closed by a screw plug tight against leakage."

Bottom Outlets

The joint-committee appointed to consider this subject has submitted its report, which has been approved by the Tank Car Committee, the American Petroleum Institute, and the American Railway Car Institute. A copy of this report with advice of such approval has been forwarded to the interstate commerce commission for consideration.

This investigation was a means of developing much information of value in connection not only with the requirements for bottom outlets, but the functioning of certain types of valves under conditions approximating those occurring in regular service. The Committee is pleased to report that a number of valves were tested which gave promise of satisfactory results, and which, therefore, were recommended for approval for general applications.

The tests furnished information suggestive of standardized methods for the investigation of bottom outlets in the future, and it is proposed, subject to approval of those concerned, that the suggestions in respect to such tests be adopted.

The work of the joint committee was concluded with the completion of the investigation, but it appeared desirable that this Committee be continued for such duties as might arise in connection with devices hereafter submitted for approval.

The Tank Car Committee desires to express its appreciation

of the attention given to the investigation by the joint committee under the direction of A. E. Smith, and also desires to acknowledge the co-operation of the American Railway Car Institute and the American Petroleum Institute in the work of the Committee.

The report of the joint committee appears as Appendix "D."

Safety Valves, Dome Covers and Bottom Outlet Valves—Reports of the respective Sub-Committees assigned to these subjects appear as Appendices "E" and "C."

The report was signed by A. G. Trumbull (chairman), chief mechanical engineer, Erie; J. T. St. Clair, engineer of car construction, Atchison, Topeka & Santa Fe; Geo. McCormick, general superintendent motive power, Southern Pacific; W. C. Lindner, chief car inspector, Pennsylvania; B. W. Dunn, chief inspector, Bureau of Explosives; A. E. Smith, vice-president, Union Tank Car Company; T. H. Beaghen, Jr., Mexican Petroleum Company; H. L. Worman, superintendent motive power, St. Louis-San Francisco; G. E. Tiley, supervisor tank car equipment, General Chemical Company, and C. C. Meadows, Tidal Refining Company.

Appendix A—Shipping container Specification 105A300—lagged welded metal tanks to be mounted on or to form part of a car

Regulations of the interstate commerce commission for the transportation of explosives and other dangerous articles by freight govern the use of tanks meeting the requirements of this specification.

Approved, effective August 15, 1928.

Note.—This specification is made general in character with respect to equipment for the loading and unloading of tanks and for the discharge therefrom of interior vapor under pressure. Additional specifications and changes or modifications thereof, or of this specification may be made effective by further orders of the commission.

1. *Type.*—Tanks built under this specification must be spherical in form, or cylindrical in form with heads disbed convex outward. The tank must be provided with a manhole ring and cover on top of the tank or sufficient diameter to permit access to the interior of the tank and to provide for the proper mounting of inlet, outlet, and safety valves, and a protective housing on the cover. No other opening in the tank is permitted, except as prescribed in par. 6 (c).

2. *Material.*—All plates for the tank must be made of open-hearth boiler plate steel of flange quality for forge welding with phosporus not over 0.04 per cent and the sulphur not over 0.05 per cent.

3. *Thickness of Plates.*—(a) For spherical tanks the wall thickness must be not less than ¼ in.

(b) For cylindrical tanks the wall thickness must be not less than ¼ in. and must be such that the fiber stress will not exceed 17,500 pounds per square inch under an interior pressure of 300 lb. per sq. in. The fiber stress in the cylindrical portion of the tank must be calculated by the following formula:

$$\text{Stress in lb. per sq. in.} = \frac{300x \text{ inside diameter in in.}}{2x \text{ wall thickness in in.}}$$

The thickness of the tank heads must be not less than the thickness of the wall of the tank.

4. *Dishing of Tank Heads.*—The radius of the dish in tank heads must be not greater than the diameter of the tank.

5. *Welding.*—(a) All seams must be lap-welded by the water gas process, hammered or rolled.

(b) All seams must be annealed after welding.

6. *Riveting.*—(a) The use of rivets is permitted only in the attachment of an anchorage to the tank for securing the tank to the underframe of the car on which the tank is mounted. Rivets must be of the same quality as used for steam boilers and other pressure vessels.

(b) Rivets must be hot pressed and driven on the inside of tank.

(c) All rivet heads on the inside of the tank must be calked and then must be covered by a metal covering fused to the tank by electric welding. The shell of the tank under the metal covering must be provided with a hole to permit making an air pressure test, and after test has been made and the covering and the rivets are found to be tight against leakage, the hole in the shell of tank must be closed by a screw plug tight against leakage.

(d) The shearing and bearing area of the rivets attaching the tank to its anchorage must be not less than 30 sq. in. and 24 sq. in. respectively, and the shearing and bearing area of these rivets must be at least 40 per cent greater than the shearing and bearing area of the rivets attaching the anchorage to the underframe of the car on which the tank is mounted.

7. *Manhole Ring and Cover.*—The manhole ring must be constructed of a seamless rolled steel forging, having a wall thickness not less than 75 per cent of the thickness of the wall of the tank, with a cover of steel plate not less than 2 in. thick, on which is bolted a valve-protecting housing of cast steel fitted with a steel cover that can be securely closed. The housing may be provided with openings to permit the connecting of piping with the venting and discharge valves without removal of the housing. The manhole cover must be attached to the manhole ring by through bolts or studs not entering the tank. The joint between the manhole ring and its cover must be tight against vapor pressure, and when necessary to secure this a satisfactory gasket must be used.

8. *Venting and Discharge Valves.*—(a) The venting and discharge valves must be of the flange type, made of material not subject to destruction by the lading, and must withstand a pressure of 300 lb. per sq. in. without leakage. The valves must be directly bolted to seatings on the manhole cover. Provision must be made for closing the pipe connections of the valves.

(b) The eduction pipes of the discharge valves may be equipped with ball check valves.

9. *Safety Valves.*—(a) Each tank must be equipped with one safety valve of the flange type, made of material not subject to destruction by the lading and mounted on the manhole cover.

(b) The safety valve must have a discharge capacity sufficient to prevent building up of pressure in the tank in excess of 300 pounds per square inch.

(c) The safety valve must be set to open at a pressure not exceeding 225 lb. per sq. in. and not less than the pressure developed by the contents of the tank at a temperature of 105 deg. F. (For tolerance see paragraph 13 on tests.)

10. *Fixtures and Other Attachments.*—No attachments other than those mounted on the manhole ring and cover, the anchorage, and safety appliances are permitted, except that heater pipes may be attached directly to the exterior of the tank by suitable bands. Safety appliances must be attached to pads on the jacket or to suitable tank bands.

11. *Lagging.*—The tank, except where it is seated on the bolsters of the car, must be lagged with compressed cork board properly molded to fit, or other material of equivalent heat insulating and shock resisting quality, to a thickness of not less than 4 in. When heater pipes are attached to exterior of tank the thickness of the lagging over each pipe may be reduced to not less than 2 in. A jacket of sheet metal not less than one-eighth inch in thickness, welded or otherwise fastened together, must entirely cover the lagging. Openings through the lagging must be flashed around projections to prevent admission of water. The manhole ring must be so constructed that liquid cannot enter between its wall and the jacket. The tank must be well painted before being lagged and the inside of jacket must be painted before it is applied.

12. *Test of Tanks.*—(a) Each tank must be tested before being put in service and also at intervals as prescribed in para. 14 by completely filling the tank and dome with water, or other liquid having a similar viscosity, of a temperature which must not exceed 100 deg. F. during the test, and applying a pressure of 300 lb. per sq. in. The tank must hold the prescribed pressure for not less than 30 minutes without leak or evidence of distress. The anchor rivets and their protective coverings must be installed before this test is made.

(b) Each tank must also be tested, after being anchored to underframe and before being put in service, by an air pressure of 100 lb. per sq. in. which must be applied to the tank, also separately to the space between the heads of the anchor rivets and their protective coverings.

(c) Calking of welded joints to stop leaks developed during the foregoing tests is not permitted. Repairs must be made as prescribed in Par. 5.

13. *Tests of Safety Valves.*—Each valve must be tested. before being put in service and also at intervals as prescribed in Par. 14, by attaching to a compressed air or gas line and applying pressure. The valve must open at the maximum pressure or not below the minimum pressure prescribed in Par. 9 (c) with no tolerance above the maximum opening pressure nor below the minimum opening pressure.

14. *Retests of Tanks, Anchor Rivet Covers and Safety Valves.*—Tanks must be retested to a pressure of 300 lb. per sq. in. anchor rivet covers to a pressure of 100 lb. per sq. in. and safety valves to a pressure as prescribed in Par. 9 (c), by the methods prescribed for original tests in Par. 12 and 13, at intervals of not more than two years. Tanks must also be retested before being returned to service after any repairs requiring welding. Reports must be rendered as prescribed in Par. 16.

15. *Marking.*—Each tank must be marked as follows:

(a) I. C. C.-105A300 in letters and figures not less than three-eighth in. high, stamped plainly and permanently into the metal near the center of one head of the tank. This mark must also be stenciled on the jacket in letters and figures at least two inches high.

(b) Initials of manufacturer and date of original test of tank in letters and figures not less than ⅜ in. high, stamped plainly and permanently into the metal of the tank immediately below the stamped mark specified in Par. 15 (a). These initials and date must also be stenciled on the jacket in letters and figures at least 2 in. high.

(c) Date on which the tank was last tested, pressure to which tested, place where test was made, and by whom, stenciled on the jacket.

(d) Date on which the valve was last tested, pressure to which tested, place where test was made, and by whom, stenciled on the jacket.

(e) Water capacity of the tank in pounds stamped plainly and permanently in letters and figures not less than ⅜ in. high into the metal of the tank immediately below the mark specified in Par. 15 (b). This mark must also be stenciled on the jacket immediately below the dome platform and directly behind the ladder, or ladders if there is a ladder on each side of the tank, in letters and figures at least 2 inches high, as follows:

Water capacity of tank
000,000 pounds

16. *Reports.*—The builder of the car on which the tanks are mounted must furnish to the car owner, to the Bureau of Explosives, and to the secretary, Mechanical Division, American Railway Association, before the car is placed in service, a report certifying that the tank and its equipment complies with all of the requirements of this specification, including passing of tests and marking. In case of extensive alterations or rebuilding of the tank, a similar report must be rendered to the same parties. For the periodic retests of tanks and safety valves, other than as above mentioned, report must be rendered only to the Bureau of Explosives and to the car owner.

Appendix B—Shipping container Specification No. 103C—Riveted chrome iron tanks to be mounted on or to form part of a car

Regulations of the interstate commerce commission for the transportation of explosives and other dangerous articles by freight govern the use of tanks meeting the requirements of this specification. Approved, effective August 15, 1928.

Tanks built under this specification must comply with all of the requirements of specification No. 103, except as hereinafter provided

1. *Type.*—No change.
2. *Bursting Pressure.*—No change.
3. *Material.*—All plates and rivets, and all projections and their closures, must be made of a metal capable of resisting the action of nitric acid without loss of more than 0.05 gram in weight per sq in. of surface exposed, when tested by submersion for a period of one month at 100 deg. F. in nitric acid of not less than 66 per cent strength, and having a content of 1 per cent of sulphuric acid (H_2SO_4) and 0.1 per cent of hydrochloric acid (HCl).
4. *Thickness of Plates.*—No change
5. *Dishing of Tank Head.*—No change.
6. *Riveting.*—No change.
7. *Preparation for Calking.*—No change.
8. *Calking.*—No change, except that inside calking of the seam formed by attachment at expansion dome to tank is required when the opening in tank shell is cut out to the full diameter of the dome.
9. *Expansion Dome.*—(a) No change, except that the expansion dome must have a capacity of not less than 1 per cent.

(b) No change, except that the opening in tank shell within the dome may be cut out to the full diameter of the dome.
(c) A dome head and manhole ring cast in one piece may be used instead of a dished plate dome head.
10. *Closures for Manholes.*—No change.
11. *Protection of Gauging Devices, Bottom Outlet Valve Operating Mechanism, and Venting and Discharge Pipes.*—Not required, but should the tank be equipped with venting and discharge pipes, the pipes must be tightly closed as prescribed in Para. 12.
12. *Venting and Discharge Pipes.*—Valves not required, provided the discharge pipe is tightly closed with a cap, plug, or other suitable fitting and the venting pipe is equipped as prescribed in Para. 14.
13. *Bottom Discharge Outlets.*—No bottom discharge outlet with valve is permitted, but the tank may be equipped with a bottom washout casting complying with the following requirements:
(a) The construction and closure of the bottom washout casting must be such that it is tight against leakage, and in case it receives a blow it will break off without injuring the tank or causing the tank to lose its contents.
(b) The extreme projection of the bottom washout casting must be at least 12 inches above the top of rail.
14. *Safety Valves.*—(a) The tank must be equipped with either a safety valve not less than 2 in. in diameter mounted on expansion dome, or a venting pipe not less than 2 in. in diameter closed with a frangible disk of lead or other suitable material of a thickness that will insure rupture at a pressure not higher than 60 lb. per sq. in., or a venting pipe equipped with baffle plates so designed as to relieve pressure without permitting splashing of contents.
(b) One safety valve or vent must be provided for each tank or compartment thereof.
(c) The safety valve must be set to open at a pressure of 60 lb. per sq. in. (For tolerance see Para. 18 on tests.)
15. *Fixtures, Heater Pipes, Seating Pads and Other Attachments.*—No change.
16. *Plugs for Openings.*—No change, except that plugs must be of the material prescribed in Para. 3.
17. *Tests of Tanks.*—No change, except that acid may be used for filling the tank and dome when testing tanks which have not been in service more than 12 years.
18. *Tests of Safety Valves.*—Valve must be tested, before being put in service and also at intervals as prescribed in Paragraph 19, by attaching to an air line and applying pressure. The valve must open at the pressure prescribed in Paragraph 14 (c), with a tolerance of plus or minus 3 lb.
19. *Retests of Tanks and Safety Valves.*—Tanks and safety valves must be retested as prescribed for original tests in Para. 17 and 18. The first retest must be conducted within 4 years after the original test, and subsequent retests at 4-year intervals up to 12 years of service, thereafter at 2-year intervals up to 20 years of service, and annually after 20 years of service. Tanks in service over 12 years must be retested with water only and be internally inspected before each retest is made.
20. *Marking.*—Each tank must be marked as follows:
(a) No change, except that marking must be ICC-103-C.
(b) No change.
(c) No change.
(d) No change, except that this marking is not required when tank is equipped with a venting pipe as prescribed in Paragraph 14.
21. *Reports.*—No change.

Appendix C—Bottom Discharge Outlets

During the past year the activities of your sub-committee on Bottom Discharge Outlets have been greatly curtailed:

1. Due to the fact that only one new design of bottom discharge outlet worthy of serious consideration has been submitted to the sub-committee for action. Three other designs, so impracticable or so incomplete that action by the sub-committee was not necessary, did not progress beyond the initial inquiry stage, although the applicants were duly advised in regard to the proper procedure to be followed in presenting their applications to the Tank Car Committee for further action.

2. Due to the fact that the joint committee comprised of representatives of the American Railway Association, the American Petroleum Institute, and the American Railway Car Institute, appointed in 1926 to make special tests of bottom discharge outlet valves, safety valves, and manhole covers, started to function early in 1927 and during the year tested eleven different designs of bottom discharge outlet valves, nine of which had previously been submitted to the sub-committee for consideration and approved for service trial as meeting the requirements of the A. R. A. tank car specifications effective March 1st, 1926, and the interstate commerce commission specifications effective July 1st, 1927. The other two valves also comply with these specifications. These tests fully justify the opinion maintained by the sub-committee for a number of years past that bottom discharge outlet valves should be positively held on their seats by some means other than a spring. Likewise, several accidents in which the bottom outlet casting was broken off of tank cars equipped with bottom discharge outlet valves complying with the new specifications serve to demonstrate the efficiency of these valves under conditions which have been the chief sources of losses charged to bottom outlet failures.

Questionnaires received to date covering the performance of valves approved for service trial indicate that the valves are reasonably tight, and that although they are occasionally found to be difficult to open, they are considered more satisfactory from the operating and maintenance standpoints than the old wing type, spring held valve.

Our records indicate that nearly 7,000 valves complying with the new specification are in service today, chiefly on cars built since March 1st, 1926. Recently a request has been received for permission to install 650 of one of the new type valves on cars originally equipped with the spring held valve, and it is anticipated that as the owners of tank cars come to realize the advantages of specification valves, there will be a great increase in the number of old cars so equipped, which should lead to a material reduction in the losses due to bottom outlet failures.

From now on, new designs of bottom discharge outlet valves submitted to your sub-committee for approval will be required to undergo a series of tests the same as those inaugurated by the joint committee. For further information in regard to these tests you are referred to the joint committee's report on tests of outlet valves, which report is approved by your sub-committee with the following reservation:

> That in lieu of the requirement that the valve shall be so constructed that when closed it may not be forced open from the underside by a hydrostatic pressure of 200 pounds per square inch in the outlet casting, the present I. C. C. specifications be revised to provide that the design of the valve members within the tank shall be such that at the weakest point they shall withstand a vertical stress not less than 40 per cent greater than the stress required to break the weakest part of the bottom outlet casting.

The sub-committee report was signed by W. E. Cooper, chairman, J. T. St. Clair, A. E. Smith, and T. Beaghen, Jr.

Appendix D—Joint Report on Bottom Outlets, Safety Valves and Dome Covers

Under date of November 2, 1925, A. G. Trumbull, chairman of the Tank Car Committee of the American Railway Association, appointed a Joint Committee on Bottom Outlets, Safety valves, and Dome Covers, consisting of the following:

American Railway Car Institute—R. H. Davenport, manager, tank car department, American Car and Foundry Company; James Dhu Andrews, Standard Tank Car Company; O. J. Parks, chief engineer, General American Car Company.

American Petroleum Institute—Thomas Beaghen, Jr., Mexican Petroleum Corporation; A. E. Smith, vice-president, Union Tank Car Company; E. A. Kraft, Pure Oil Company, Chicago, Illinois.

American Railway Association—A. G. Trumbull, chief mechanical engineer, Erie; W. C. Lindner, chief car inspector, Pennsylvania; W. E. Cooper, Bureau of Explosives.

to make a thorough investigation of the above named devices now in use on tank cars with a view to suggesting improvements if possible and also to designate preliminary tests which these devices should meet prior to service.

The first meeting of this joint committee was held on February 17th, 1926, for the purpose of discussing and obtaining ideas as to just how the committee should function. Mr. Trumbull appointed A. E. Smith as chairman of the joint committee and also appointed a sub-committee consisting if: R. H. Davenport, Thomas Beaghen, Jr., and Col. B. W. Dunn, for the purpose of arriving at definite conclusions.

[The committee then gave a complete report of its meetings, the proposed scope of the investigation, of the employment of D. V. S. Stroop, associate engineer of the Bureau of Standards to supervise the tests, description of the test plant and method of testing.—Editor]

Outlets Tested

The bottom outlets tested during this investigation may be divided into two classes:

Class A: This class was represented by valves No. 2 and No. 13. They utilized non-metallic elastic material in effecting the valve closure. The successful use of valves in this class presupposes that suitable materials are available or many be provided which will successfully resist the solvent and other deteriorating action of the lading in the car in which the valves is to be installed. It further pre-supposes that the shape and elastic properties of the non-metallic material will not be seriously impaired by a considerable number of operations of the valve.

Class B: This class was represented by such valves as No. 1, No. 3, No. 4, No. 5, No. 6, No. 8 and No. 9. These are the valves which depend upon a full metallic closure and are the outgrowth of the familiar spring held valve that has been in general use for a number of years. Even when such valves are positively held on their seats it is often difficult to maintain a tight closure. It is supposed that every user of tank cars has had some trouble with this class of valve. The seats may become pitted or scored from sediment, corrosion may cause troublesome leakage and unskilled regrinding may make a valve worse instead of better. In spite of the numerous difficulties encountered in this class of valve they may serve adequately for long periods of time with only small leakages if they are positively held on their seats.

The tests made on all of the valves during this investigation were such that the defects in the Class B valves were more apparent than those in the Class A valves. This was but

natural since it was known that most of the valves submitted would fall in the B class. Therefore, it must not be too readily assumed that the Class A valves, which performed so well in the tests, are the final word in valve construction.

It appears that more effort has been devoted to the development of Class B valves than to Class A valves. As there has been considerable improvement in Class B valves during the past few years, it may be assumed that further improvements in both classes may be expected in the next few years, particularly in the Class A valves.

For this reason, it is not deemed advantageous to recommend the adoption of a standard outlet valve until all of these newer types of valves have been thoroughly tried out under severe service conditions.

Since the Class A valves appear to give greater promise of stopping drop leakage and are likely to be of greater value for use on tank cars where it is desirable to prevent all leakage, it is felt that valves of this class should be more rigorously tested than Class B valves.

It is believed that information of considerable value has been obtained from the tests made during this investigation and it is felt that all new valves proposed for use on tank cars might well be tested in a similar manner before being authorized for service.

With this in mind it is proposed that specifications and test procedure be adopted to cover new valves proposed for use on tank cars. Every valve submited should conform to the specifications and pass the tests prescribed for the class to which it belongs before it could be authorized for service.

The following specifications and tests are suggested:

Class A Outlet Valves—Definition

Class A outlet valves shall be understood to mean any and all tank car bottom outlet valves so constructed that closure is ordinarily secured by means of a suitable non-metallic material, provided such valves meet the following specifications and minimum requirements when tested as prescribed for that class of valves.

Application for Service

Each application for authority to make a service installation of a Class A outlet valve shall be accompanied by the following information:

(1) A complete set of dimensioned working drawings of the outlet valve.
(2) A complete set of specifications covering the materials used, the details of construction and operation, and the service in which the valve is proposed for use.
(3) A certificate signed by the manufacturer of the non-metallic material showing that the specified material is suitable for use in the manner and service specified.
(4) A report by the Purdue University, or other approved agency, showing that the outlet valve has been properly constructed and tested as hereinafter specified and that it has fully met the minimum requirements for a Class A valve.

Construction

(1) The non-metallic material used in the valve shall be certified by the maker to have met all specified requirements when subjected to the tests herein prescribed for such materials.

(2) The valve shall be so constructed that when closed it may not be forced open from the underside by a hydro-static pressure of 200 lb. per sq. in. in the outlet casting.

(3) A supplementary full metallic closure shall be provided and so constructed that, if the non-metallic material fails or is omitted, the valve will meet all the requirements specified for a Class B valve.

(4) The valve shall be so constructed that no part of the valve shall extend below the V-groove in the outlet casting unless it is scored or so constructed that it will break without unseating the valve.

Tests

(1) The non-metallic material shall be tested as follows:

(a) Three representative samples shall be taken of the material and shall be cut so as to have an original cross sectional area of not more than one square inch.

(b) Determine ultimate tensile strength of sample No. 1 in pounds per square inch for cross sectional area of unstressed sample.

(c) Immerse samples No. 2 and No. 3 for 96 hours in 100 deg. F. bath of product in which it is proposed to use the material. For example, gasoline of certain grade.

(d) Upon removal of sample from bath, determine the per cent increase in cross sectional area compared with original area.

(e) Dry sample No. 2 in oven at 100 deg. F. for 24 hours.

(f) Determine per cent increase in cross sectional area compared with original area.

(g) Determine ultimate tensile strength of sample No. 2 in pounds per square inch of cross sectional area of original unstressed sample.

(h) Determine per cent of original sample No. 3 that was dissolved in the 100 deg. F. bath after the sample has been thoroughly dried in an oven at such a temperature and for a sufficient length of time to insure that all of the liquid product has been driven off.

(2) The completely assembled valve shall be installed in a swinging test tank of approximately 2,000 gallons which when filled with water shall be impacted against a loaded railway car, or equivalent obstruction, fifteen times at an average speed of five miles per hour. No draft gear or coupler shall be installed on either the swinging tank or the bumper to absorb any part of the impart shock, which should be transmitted directly through the solid buffer plates, the center sills and the tie plates to the tank.

(3) The outlet casting shall be closed with a suitable tapped fitting and by means of a suitable pump the casting shall be subjected to an internal hydrostatic pressure of 200 lb. per sq. in.

(4) Five gallons of rust and scale from tank cars shall be added to the water in the tank and the valve shall be opened and closed 50 times.

(5) After refilling the tank with water, the valve shall be fully opened to drain the tank and determine the discharge capacity of the valve.

(6) The non-metallic material shall then be removed and the valve tested, using only the supplementary metallic closure. This test shall conform in all respects to the tests prescribed for Class B valves except in regard to the breaking of the outlet casting.

(7) After completing all of the above tests the non-metallic material shall be replaced, the valve closed and the tank filled with water. The outlet casting shall then be broken off with the tank swinging at a speed of five miles per hour against an obstruction so placed that the blow is delivered directly to the outlet casting at or near the level of the bottom of the center sills.

Minimum Requirements:

(1) The non-metallic material shall meet the following requirements:

(a) (Test 1-d) After 96 hours immersion the cross sectional area of the sample shall not increase more than 25 per cent when compared with the original sample.

(b) (Test 1-f) After drying, the cross sectional area of the sample shall not exceed 105 per cent of the cross sectional area of the original sample.

(c) (Test 1-g) After drying, the ultimate tensile strength of the sample shall be at least 80 per cent of the ultimate strength of the original sample.

(d) (Test 1-h) Not more than 4 per cent by weight of the original sample shall be dissolved by the liquid product in the 96 hour immersion test.

(2) (Test 2) The valve shall not leak during or at the conclusion of the impact test.

(3) (Test 3) The value shall not be damaged in any way by the hydrostatic pressure in the outlet casting and shall not leak when the pressure is released.

(4) (Test 4) The value shall not leak upon closure at any time during the operative test.

(5) (Test 5) The discharge capacity of the valve for water should exceed 200 gallons per minute.

(6) (Test 6) The requirements for passing this test shall be the same as those specified for Class B valves.

Class B Outlet Valves—Definition

(7) (Test 7) The valve shall not leak when the outlet casting is broken.

Class B outlet valves shall be understood to mean any and all tank car bottom outlet valves constructed entirely of metal, provided such valves meet the specifications and minimum reouirements when tested as prescribed for that class of valves.

Application for Service

Each application for authority to make a service installation of a Class B outlet valve shall be accompanied by the following information:

(1) A complete set of dimensioned working drawings of the outlet valve.
(2) A complete set of specifications covering the materials used, the details of construction and operation and the service in which the valve is proposed for use.
(3) A report by Purdue University or some approved testing laboratory showing that the outlet valve has been properly constructed and tested as hereinafter specified and that it has fully met the minimum requirements for a Class B outlet valve.

Construction

(1) The valve shall be so constructed that when closed it may not be forced open from the underside by a hydrostatic pressure of 200 pounds per square inch in the outlet casting.

(2) The valve shall be so constructed that no part of the valve shall extend below the V-groove in the outlet casting unless it is scored or so constructed that it will break without unseating the valve.

Tests

(1) The completely assembled valve shall be installed in a swinging test tank of approximately 2,000 gal. which when filled with water shall be impacted against a loaded railway car, or equivalent obstruction, fifteen times at an average speed of five miles per hour. No draft gear or coupler shall be installed on either the swinging tank or the bumper to absorb any part of the impact shock, which should be transmitted directly through the solid buffer plates, the center sills and the tie plates to the tank.

(2) The outlet casting shall be closed with a suitable tapped fitting and by means of a suitable pump the casting shall be subjected to an internal hydrostatic pressure of 200 lb. per sq. in.

(3) Five gallons of rust and scale from tank cars shall be added to the water in the test tank and the valve opened and closed 50 times.

(4) After refilling the tank the outlet casting shall be broken by swinging the test tank at a speed of five miles per hour against an obstruction so placed that the blow is delivered to the outlet casting at or near the level of the bottom of the center sills.

(5) Upon the completion of the above tests the full tank of water shall be discharged through the fully opened valve in order to obtain its discharge capacity.

Minimum Requirements

(1) (Test 1) Leakage through the valve during the impact testing shall not exceed one fluid ounce of water per minute at any time.

(2) (Test 2) The valve shall not be damaged in any way due to the 200 pounds per square inch hydrostatic pressure in the outlet casting and shall not leak more than one fluid ounce of water per minute when the pressure is released.

(3) (Test 3) The value shall be capable of closing off all but one fluid ounce of water per minute at any closure during the operative test.

(4) (Test 4) The valve shall not leak at a rate of more than one fluid ounce of water per minute after the outlet casting is broken.

(5) (Test 5) The discharge capacity of the valve for water should exceed 200 gallons per minute.

Service Installation for Class A and B Bottom Outlets

(1) A complete record of the service installation of such valves shall be furnished to the Tank Car Committee of the American Railway Association by the party to whom the authorization is granted.

(2) The same party shall be responsible for the obtaining of all information regarding the performance of the valves on a form prescribed by the Tank Car Committee of the American Railway Association, the movements of the cars and the commodities transported for a period of 12 months of active service.

(3) At the end of 6 and 12 months of active service, all such information shall be suitably compiled and submitted to the Tank Car Committee for its information in deciding on the suitability of the valve for continued use on tank cars.

None of the valves submitted during this investigation were tested to the extent above suggested for Class A valves. However, valves No. 2 and No. 13 successfully passed all of the tests which were made and they should be considered as possible successful types of valves in that class.

Of the Class B valves submitted, No. 1, No. 3, No. 4, No. 5, No. 6, No. 8 and No. 9 are considered as possible successful types of valves in that class.

Valve No. 4 has been subjected to the criticism that it may not remain closed in the event of a wreck where the tank car after falling a distance might strike the ground in an inverted position and then roll over on its side. It is believed that this objection can be eliminated by a suitable change in the control mechanism.

Valve No. 8 has been authorized for service trial and it will undoubtedly be preferable to judge its suitability from the results of these tests. The valves submitted for test could not be made tight they were difficult to operate and had a particularly low discharge rate. They were not affected by the impact test or the breaking of the outlet casting. No recommendation is made in regard to this valve which should be judged by its performance during service trial.

Valve No. 6 passed the tests satisfactorily but did not conform to the specification that "when closed it may not be forced open from the underside by pressure." Until this is accomplished the No. 6 valve should not be used in service.

Mr. Stroop's report of November 7, 1927, covering a service valve in the B class, approved by the Tank Car Committee clearly indicates what can be expected if tank car valves are not properly maintained and the Committee wishes to emphasize the necessity for proper care for the maintenance of all classes of tank car valves.

Recommended

It is recommended:

(1) That two classes of outlet valves be recognized and specified viz:

Class A—Valves with both non-metallic and metallic closure.

Class B—Valves with metallic closure only.

(2) That detailed specifications, test and service procedure following the lines suggested in this report, be adopted as tenative standards.

(3) That valves No. 1, No. 3, No. 5 and No. 13 be authorized for service.

(4) That valve No. 2 be authorized for service after the valve has been modified to provide a supplementary full metalic closure for emergency use and subsequently tested as precribed.

(5) That valve No. 4 be authorized for service provided the valve control mechanism is modified so as to prevent the valve opening when the tank car is inverted and subsequently tested as prescribed.

(6) That valve No. 6 be authorized for service as soon as it is provided with a satisfactory means to prevent it from being forced open from the under side by pressure and subsequently tested as prescribed.

Safety Valves

In making tests of safety valves the following procedure was followed:

Leakage tests were made with air pressure in test tank and by observing bubbles passing through the valve when the top of the cage was filled with water.

In order to accurately determine the discharge capacity of any valve, it would be necessary to provide an extensive reservoir capacity of compressed air. This was not thought to be necessary or desirable as a comparative test could be made which would give sufficient information to judge whether a proposed valve could relieve the presssure in a tank as rapidly as the A. R. A. Standard safety valve.

The procedure was to install the safety valve and clamp the clapper down hard against the seat, then bring up the pressure in the 266 cubic foot tank to approximately 40 lb. per sq. in. and release the clapper.

A continuous record of pressure variation in the tank was outlined on a chronograph. It was known that a certain amount of lag in the action of the instrument prevented the recording of the exact pressure existing in test tank at a given instant but the results obtained indicate that comparison could be made between safety valves. This is not intended to be a final method of determining the discharge capacity of any valve but is an inexpensive means of making approximate comparisons between an unknown valve and a valve the discharge capacity of which is known to be satisfactory.

Recommendations

(1) Because of erratic performance of valves No. 7 to No. 12 inclusive, it is recommended that all valves of this design should be removed from tank cars used for the transportation of inflammable liquids.

(2) Because of the inability of valves No. 1 to No. 6 inclusive (Standard A. R. A. Safety Valves), to prevent vapor leakage at low pressures, it is recommended in order to get a tight closure that valves should be ground in periodically and further consideration be given to the use of a more satisfactory method of closing on valves in service on tank cars used for the transportation of highly volatile inflammable liquids.

(3) Valves No. 16 to No. 18 inclusive, appear to present a distinct advantage over all of the valves tested in regard to vapor leakage and it is recommended, subject to slight changes for improving their discharge capacity and not to be less than that of the present A. R. A. Standard safety valve, that the use of these valves be authorized as optional equipment on tank cars used in the transportation of highly volatile inflammable liquids or other service where the volatility of the product transported makes it desirable to prevent vapor leakage at low pressures.

Dome Cover

It will be noted from Mr. Stroop's report that but one dome closing arrangement was submitted to the Joint Committee for test. It is recommended that, provided the design of this device is so improved as to prevent the removal of entire assembly from a tank car containing internal pressure, it be authorized for application as optional equipment on tank cars transporting highly volatile inflammable commodities if its present service trial record proves satisfactory.

The Joint Committee asks the Associations to signify their approval of the above recommendations so that appropriate action can be taken by the Tank Car Committee of the American Railway Association, which will in turn, through its Chairman, obtain endorsement of this method of procedure by the Interstate Commerce Commission.

The Joint Committee feels that substantial progress has been made in requiring preliminary tests of devices before application can be made to tank cars for service as an inventor will necessarily have to pay for this preliminary test which will tend to eliminate devices which are unsuitable for service. If the devices satisfactorily meet this preliminary test, there should be no reason to delay approval for service. With the results of the service before them, delays in giving approval for unlimited usage by the Interstate Commerce Commission and the American Railway Association would be avoided provided the devices satisfactorily meet both the preliminary and service tests.

As far as the Joint Committee is aware, all parties who had made a request for approval of their devices were notified and given an opportunity to submit them for testing by the Joint Committee. The test apparatus, donated by the Union Tank Car Company, has now been installed at Purdue University and in future all new outlet valves, dome covers and safety valves to be used on tank cars must be submitted for test at and by that institution in accordance with the above recommendations.

The Bureau of Standards rendered invaluable assistance in connection with the work undertaken by the Joint Committee and the Committee feels that the interests represented by the Joint Committee were extremely fortunate in having secured the services of Mr. Stroop, who, throughout all of the period covered by the experimental work, demonstrated that he was able, resourceful and thoroughly competent. The Chairman also wishes to thank all of the members of the Joint Committee for their co-operation.

Appendix E—Dome Covers and Safety Valves

No. 1—A. R. A. Standard bolted type of dome cover for Class III cars adopted by letter ballot, Circular DV-483, has been filling the requirements for this class of car and to date we have had no complaints regarding its proper functioning.

No. 2—Your Committee will shortly submit a design of dome cover for class IV cars for which there is at present no standard. The fundamental principles of this cover are now embodied in covers in services on tank cars of various ownerships and have given satisfactory service.

No. 3.—The A. R. A. standard screw type dome cover with internal lift actuated by pressure within the tank, which is intended to prevent its removal while pressure exists, reported on in our 1927 report, has, from questionnaire reports received, successfully passed the experimental stage to permit more extensive application.

No. 4—The development of a suitable loading and unloading device which will obviate the necessity of removing dome covers when loading or unloading inflammables to overcome the losses of volatile gases as well as reducing the hazard incident to this operation is still in the experimental stage; however, certain of the devices now under trial have shown the possibility of perfecting such a device and your Committee is actively following up their performance.

The Skelly loading and unloading device has been applied to a number of cars and we have had no reports of unsatisfactory service.

Shanley loading and unloading device: None applied.

Humble loading and unloading device: Applied to 55 cars; no reports received indicating unsatisfactory service.

Union Tank Car Company closed circuit device: Applied to 225 cars; performance good.

Outrage Eliminating Device, formerly Manhattan Supply Co.

Applied to 68 cars; general service good, one or two instances of leaks at bottom outlet valve rod stuffing box, sand holes in castings, and it was necessary to renew two resilient gaskets. Service otherwise satisfactory.

Future development of dome covers on tanks carrying inflammables should embody features that will make it unnecessary to remove the covers when loading and unloading and all such covers should be given a laboratory tests as recommended by the Joint Committee of the A. R. A. A. P. I. and A. R. C. I. before they are put in service.

Safety Valves

Tests conducted on various designs of safety valves indicates that the present A. R. A. standard design is satisfactory in so far as proper functioning from a safety standpoint is concerned; however, complaints have been made regarding the tightness of the valves up to the predetermined opening pressure. To overcome this condition a valve is being developed in accordance with A. R. A. Standard design, except that a resilient gasket will be provided to form a secondary closure of the valve. This valve will be given a laboratory test to check its discharge capacity as well as tightness before it is placed in service.

The report of the Sub-committee was signed by W. C. Lindner, *Chairman*, Geo. McCormick, J. T. St. Clair, A. E. Smith.

Discussion

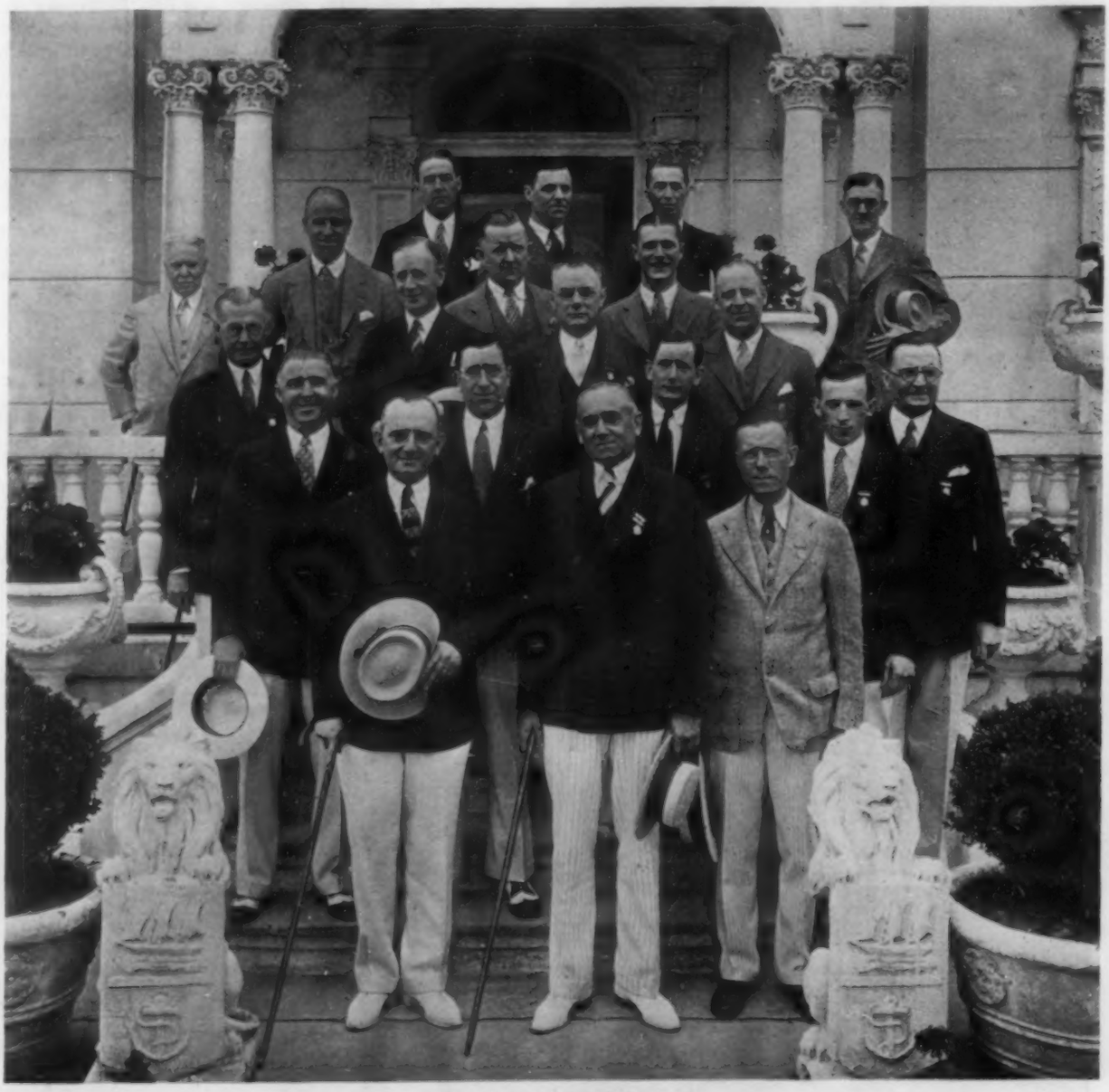
Mr. Brazier: I move the report be accepted and the proper portions be submitted to letter ballot.

(*The motion was carried.*)

Chairman Smart: We have a report that we cannot do justice to if it is presented today. I am going to suggest that we take this up the Wheel Report the first thing tomorrow morning.

(*The meeting then adjourned.*)

* * *



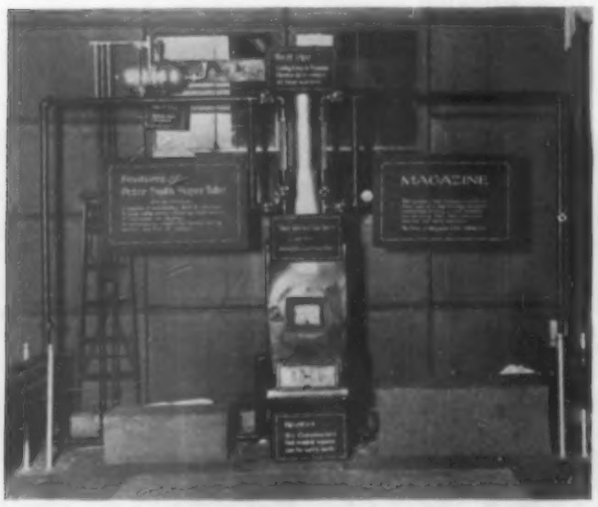
Enrollment Committee

Bottom row, left to right—J. E. Brown, chairman; F. E. Dodson, vice-chairman; C. A. Otto. Second row—T. F. Sheridan, F. C. Koch, P. B. Miller, P. D. Mallay. Third row—W. R. Van Steenburg, H. L. Burrhus, G. Gregory, B. T. Moffatt, M. K. Tate. Fourth row—F. M. Hartley, Jr., G. M. Buchannan, R. C. Bucholz. Top row—Alexander Smith, J. E. Leonard, P. E. Raymond, B. J. Wilson, A. D. Stuver.

New Devices

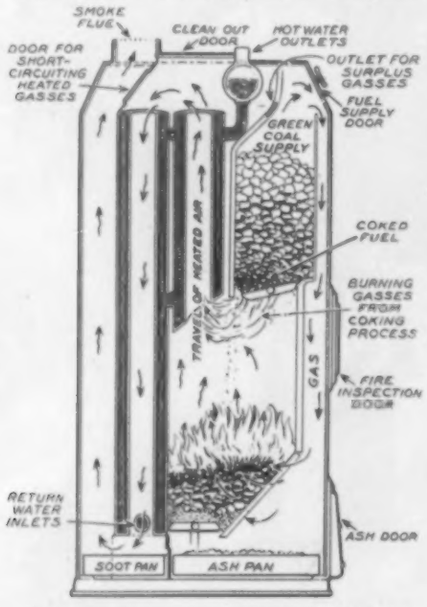
Hot Water Heater for Motor Rail Cars

THE Peter Smith Heater & Manufacturing Company, Detroit, Mich., is exhibiting a hot water heater designed particularly for use in motor rail cars. The exterior lines of the heater are simple and



The Piping Arrangement of the Peter Smith Heater for Rail Motor Cars

readily fit in with the general design of car equipment of this type. This heater is constructed so as to obtain the greatest efficiency in fuel consumption when used in this class of service, and is designed to burn



Sectional View of Peter Smith Heater

various grades of bituminous coals. While designed primarily to operate at greatest efficiency with bituminous coal, it will burn anthracite coal or coke with satisfactory results. This heater has been tested to assure ample capacity to cope with the worst conditions met in actual practice.

The magazine and furnace are a combined unit, by means of which green coal is never fed directly on the fire, but it is gradually coked—all the volatile gases are burned, both in the coking process at the point of coking and in passing through the lower sloping grate and over the fire bed. Under actual test the heater has held an average load without stoking for a period of eight hours, while the magazine has an added fuel capacity of 60 lb. The grate in the magazine is so made to allow free stoking when necessary. The heating elements stand an internal hydrostatic pressure test of 250 lb. per sq. in. The movable parts are readily accessible and, should renewals be required, they can be easily reached through the large doors and replacements made without any difficulty. In installing this equipment in a motor rail car, one row of 2¼-in. and one row of 2-in. Vulcan fin tubing is used as a radiating element throughout the car.

Provision is made for cleaning all parts conveniently. The clean-out plate at the top of the heater provides convenient access to the flues for cleaning purposes when necessary. The hot water feed and return connections are properly placed, thereby simplifying the connecting of the heater to the radiation in the car.

Brake Valve Cylinder Cap

A NEW cylinder cap for the equalizing portion of universal valves and for triple valves has been developed by the Westinghouse Air Brake Company, Wilmerding, Pa. It contains a curled hair strainer whose purpose is to guard this vital part of the equip-

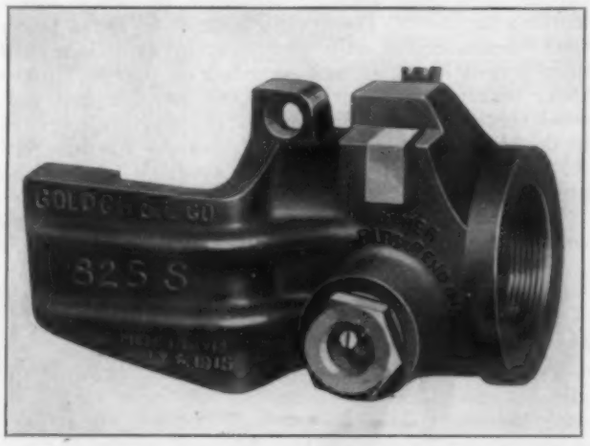
This Cap Contains an Air Strainer To Remove Grit Coming from the Brake Pipe

ment against the relatively small quantity of fine grit coming from the brake pipe in the form of dust and iron

oxide. Results obtained with this improved cap in service have indicated that the equalizing portions will remain clean and the packing rings free in their grooves for a much longer period, thus helping to improve performance and lower maintenance.

The Gold Straight-Shank 2-in. Coupler

A STRAIGHT-shank 2-in. coupler for use with metallic conduit is included in the exhibit of the Gold Car Heating & Lighting Company, Bush Terminal, Brooklyn, N. Y. This coupler is a full 2-in., including



The Gold No. 825-S, 2-in. Straight Shank Coupler

the gasket and as condensation is much greater with metallic conduit, the use of a gravity trap is recommended to clear the condensation from the pockets between the cars formed by the looping of the connections.

The coupler is locked in position by a wedged-shaped key which is tapped over the toe of the adjoining coupler.

Light Weight Electric Drive for Buses

A FORM of electric drive suitable for use on buses, which is remarkable for its light weight, is being exhibited by the National Railway Appliance Company, New York. It performs the function of a generator and motor and is contained within a single housing. Its form of construction is unique in that it embodies two armatures, which revolve in a single field. The field poles and windings, which are stationary, are in the center of the machine and the machine housing provides the return path for the magnetic flux. The two armatures, motor and generator, are of hollow squirrel cage construction, one within the other, and rotate between the field poles and the housing. The unit on exhibit is rated at 100 hp. and weighs, complete, only 1,400 lb. The manufacturer claims an overall efficiency of from 75 to 82 per cent.

The generator armature, which is connected directly to the engine, has three windings and a three-part disc commutator on one end. The motor armature, which is connected to the drive shaft, has two windings and a two-part disc commutator. Both armatures rotate in the same direction, but at different speeds, depending on the speed of the engine and the vehicle.

The controller is mounted on the steering column of the bus. At starting it serves to connect the three-generator windings in multiple, providing minimum voltage and maximum current, and to connect the two motor windings in series. Through the different steps of control, the series and multiple connections are changed until at high vehicle speed the generator armature windings are in series and the motor windings in multiple. Two resistance steps are used between each change of connections.

The field has three windings, a shunt winding connected to the generator brushes, a series winding, which carries motor current, and a tickler winding connected to the storage battery, which causes the machine to build up quickly. As one of the armatures acts as a motor and the other as a generator, the builder states that armature reaction is compenseated for without interploes and pole face windings, and that excellent commutation is obtained at all speeds. At maximum speed the motor armature r. p. m. is much greater than that of the generator.

One end of the generator armature is supported by the rear crank shaft bearing of the engine and the other on a large ball bearing. The motor armature is supported on one end on a roller bearing, and on the other by a large ball bearing, which surrounds the quill, holding the field poles.

The drive also provides an electric service brake. When the controller is placed in the braking position the motor acts as a generator and dissipates energy into a resistance. For emergency braking the controller may be thrown into reverse position.

For starting the engine, the generator is used as a starting motor. The battery is charged during normal operation by connecting it across one of the generator windings.

Smooth Bore Metallic Conduit

THE Vapor Car Heating Company, Railway Exchange, Chicago, has acquired the rights for the manufacture and sale of the former Phillips metallic steam hose, which has been redesigned and made

Smooth Bore Metallic Conduit Used as Passenger Car Steam Connection

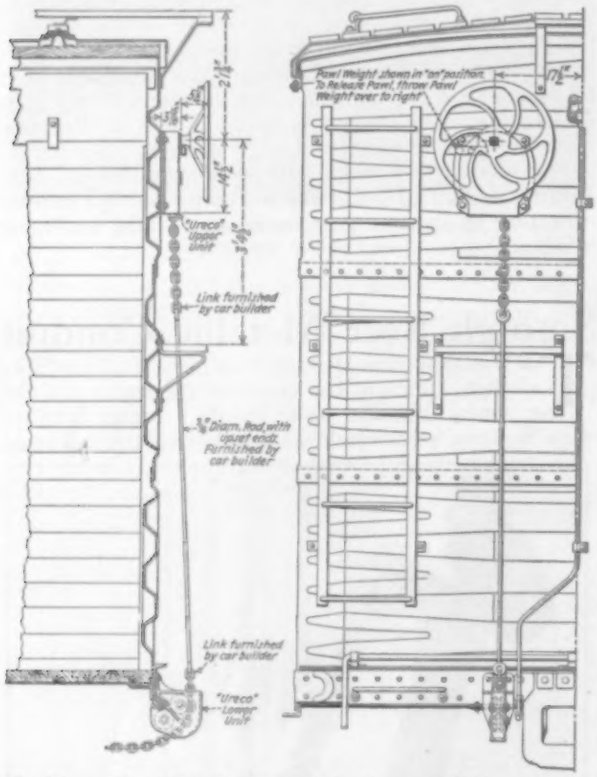
2-in. in size throughout. It is designated as the Vapor Company's No. 1135 smooth bore metallic conduit and is included in this company's exhibit. The design provides for free flexibility under any pressures or conditions of service and for unlimited movement in any direction. The smooth inner bore is claimed to eliminate steam eddies and consequent friction which results from obstructions within the path of the steam. It is designed to house or protect gaskets from dust or grit.

The conduit is designed for use with 2-in. end train-pipe valves and 2-in. steam couplers, but may be fitted with adapter top and bottom connector castings to permit its use with any 1½-in. end valve and with the present 1½-in. steam lose couplers.

Ureco Type BA Hand Brake

THE Union Railway Equipment Company, McCormick building, Chicago, is exhibiting its Type BA hand brake for use on automobile cars, gondolas, and other type of car where it is desirable to keep the hand brake below the top of the car.

The brake supplies the hand-braking power recommended by the A. R. A. The power can be applied


Pawl Weight shown in "on" position. To Release Pawl, throw Pawl Weight over to right
"Ureco" Upper Unit
Link furnished by car builder
¾" Diam. Rod with quart ends. Furnished by car builder
Link furnished by car builder
"Ureco" Lower Unit

The Ureco Type BA Hand Brake is Located Below the Top of the Car

quickly owing to the novel quick take-up arrangement which absorbs the slack chain with the initial spin of the hand wheel. The double pulley arrangement at the end sill is unlimited as to travel and constant as to power. It reduces the angle of bend which the chain takes in going from the vertical to the horizontal, thereby reducing friction to a minimum and eliminating the locking of the chain links on each other. The double-pulley arrangement at the end sill eliminates limited travel, variation in leverage and the necessity for an accurate length of hand-brake chain and its frequent adjustment.

A Three-Ton Elwell-Parker Portable Electric Crane

AMONG the exhibits of the Elwell-Parker Electric Company, Cleveland, Ohio, is a new 6,000-lb. capacity portable electric crane arranged so that it may be equipped with a special telescopic boom. With the exception of the phosphor-bronze drive worm, all of the vital parts of this crane, from the motor to the wheels, are made of heat-treated chrome-vanadium, nickel or molybdenum steel drop forgings. The crane is equipped with an extra heavy Elwell-Parker power plant. The axle is of the full floating type, with heavy yokes carrying double compound coil springs for frame support and automatically lubricated renewable liners in the axle posts. The trailing axle is an extra heavy steel I-beam section, with wheels carried on independent drop forged knuckles, and mounted on double Timken roller bearings. The driving wheels are equipped with solid rubber tires, 22 in. by 4½ in., and are mounted in double-row ball bearings, each bearing consisting of 32 15/16-in. balls. The trailing, or front wheel tires, are 15 in. by 5 in.

The crane mechanism proper consists of a battery compartment which carries both the battery and the

Elwell-Parker 3-Ton Crane with 19-ft. Boom

hoist units which serve as a counter-weight for the boom and load.

The hook and boom operating mechanism is located over the battery compartment. One motor operates both cable drums, one or the other being engaged by the throw of a lever located on the dash just above the hoist controller. The interlocking mechanism applies the brake on the end of either worm which drives the cable-drum worm wheel whenever the other drum is selected to operate; viz, when raising or lowering the boom the hook-cable drum is locked while an electro-mechanical brake on the hoist motor controls the cable then being used to elevate the hook.

All hoist gearing runs in oil. Cables run without bends to the upper end of the boom. The revolving or rotation of the entire crane mechanism is effected through a controller on the dash with a slewing unit located beneath the battery compartment. This unit

is operated by a separate motor with an electro-mechanical brake.

The special boom shown has been developed to serve the high locomotives now in use on Western roads. In trimming these locomotives, the steam domes, superheaters, turbo-generators and, especially, the throttle, must be lifted high over the boiler with a minimum loss of head room. The throttle is dropped down inside the dome into place. Aside from these requirements, which call for a 19-ft. boom, the balance of the trimming is more easily accomplished with a shorter boom so this one has been designed to telescope to as short as 12 ft. in length, which makes it easy to handle air pumps, main reservoirs, side rods, pistons, cylinder bushings, couplers, etc. Special care has been taken in this design to provide flexibility in operation by long-range telescopic boom action and ample traction without increasing the weight to a point where too great a percentage of the battery power will be used in moving the tool from place to place. All Elwell-Parker safety features are incorporated in the design. The motors and controllers are fully enclosed. The steering connections are of the ball and socket type. The Alemite system of lubrication is used throughout.

Double Color-Change Classification Lamp

A CAST aluminum classification lamp with a double-color change is included in the exhibit by the Dressel Railway Lamp & Signal Company, Arlington, N. J. The double color-change feature renders the lamp serviceable for three color-light combinations, e. g., two white lights, two green lights, and one green and one red light.

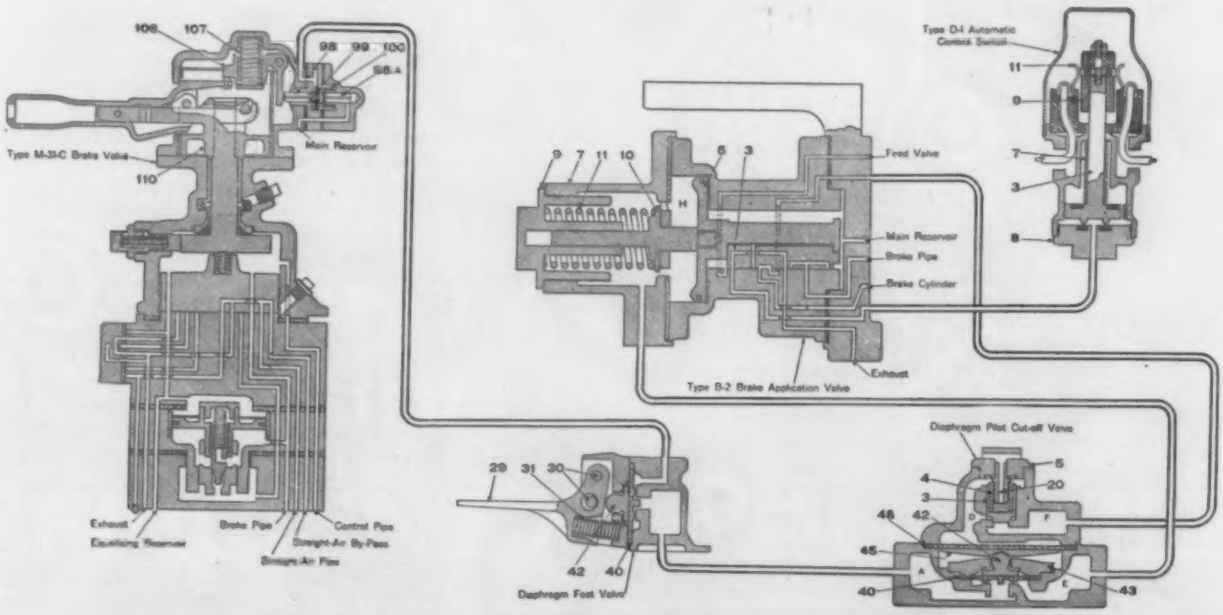
The lamp has a permanently mounted base, fitted with a two-lens helmet. Besides the ordinary single color change, consisting of two marker glass frames suspended across the lens openings and operated by an external handle from either side of the lamp, another set of marker glasses interposed between the first set and the electric bulb, is suspended on the same axis. This second set of marker glasses is operated in the same manner as the first by external handles.

A shield is fastened into the helmet to concentrate the light so that only light that has passed through the marker glasses passes through the lenses. By this arrangement the full efficiency of the light is maintained and the lens shows only the color of the marker glass. A secondary function of the light shield is its protection of the marker glasses, which are entirely covered by the shield and thus are protected from dust. When the helmet is open, the shield is easily removed, while the helmet locks the shield in a rigid position when the lamp is closed.

Safety Control for Gas Rail Cars

THE operation of gas and gas-electric rail cars may now have an additional safeguard by virtue of the safety control feature recently developed by the Westinghouse Air Brake Company, Wilmerding, Pa. This feature, which is similar to that being used on several thousand street cars, provides for automatic stopping of the car if the operator becomes physically disabled. It comprehends the interlocking of car control and brakes in such a way that if the operator takes his hand from the brake valve without first having built up a predetermined cylinder pressure, the power is shut off and an emergency brake application made.

A brake application valve serves to vent brake pipe pressure; the brake valve embodies a pilot valve which actuates the brake application valve; an automatic control switch is used in the engine ignition system automatically to interrupt the source of power; a cut-off valve automatically renders the safety control features inoperative when a brake application has been made and a foot valve permits the operator to remove his hand from the brake valve handle without actuating the safety features, when desired.

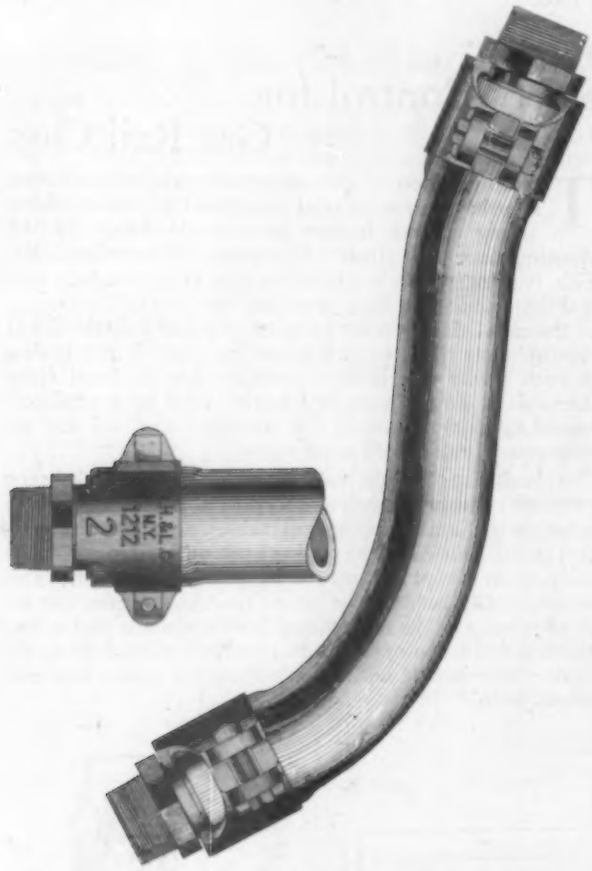


Diagrammatic View of the Westinghouse Safety Control Devices for Gas Rail Cars

Seven-Ply Molded Steam Heat Hose

THE Gold Car Heating & Lighting Company, Bush Terminal, Brooklyn, N. Y., is exhibiting a steam-heat hose which has been molded to obtain the exact contour of the curve assumed by the hose in service. This is a seven-ply hose which is 24 in. long, 2 in. inside diameter, 3¾ in. outside diameter and which has an inner tube ¼ in. thick.

The purpose of the moulded curve is to permit a natural flow of steam without bends, thus setting up a minimum of friction to retard the flow of steam. The design also provides for flexibility on curves with no rigid parts to break off. It is said that the hose will not kink.



The Gold 2-in. Seven-ply Moulded Steam-heat Hose

Kant-Rust for Lubricating and Preventing Rust

KANT-RUST, a scientifically prepared lubricating and penetrating liquid, is being exhibited by the Kant-Rust Products Corporation, Rahway, N. J. The liquid contains colloidal graphite made by a patented electrical process. The graphite is free from grit and other impurities and is fine enough to remain in suspension. Because of this, the graphite penetrates into inaccessible parts.

It can be used to advantage on many car and locomotive parts. It can be applied to locomotive springs without separating the leaves and the graphoid surfaces thus set up will permit freer performance and prevent rust.

Kant-Rust loosens rusty fish plate bolts and makes track switches work easily and also prevents freezing. Before using a chisel to release nuts on tender truck bolts, freight car trucks, truss rods, binder bolts, etc., this preparation may be applied to advantage.

In the shop, it is recommended for use on the frictional surfaces of all tools, such as ratchet tools, air and electrically-driven tools of all kinds, drilling machines, punches, lathes, planers and grinders. It can be used to advantage for the removal of pulleys from shafting where corrosion or rust formation has taken place.

It can also be used to loosen rusty pipe couplings, nuts, bolts and machine parts. It cleans metal and cuts old grease and dirt. Kant-Rust, not being a mineral graphite, is a non-conductor, consequently it can be used with safety on electric motors where frictional oil is required, thus preventing gumming and freezing. It also releases corroded battery terminals.

National Passenger-car Window

INCLUDED in the exhibit of The National Lock Washer Company, Newark, N. J., is a new type of passenger-car window to keep out water and dust and to prevent rattle.

The novel feature of the window is that there are no side stiles or top rail. The glass is mounted in the lower rail which is of extruded aluminum, similar to the method followed in the mounting of automobile wind shields. A brass sill piece is placed on top of the window sill, shaped to receive the bottom rail of the window and to prevent the water from seeping in under the window. The locks and lifts are attached to the bottom rail. The side construction consists of outside center and inside stops of rolled brass. The center stop floats. It carries a metal container, in which is inserted belt runways which carry the glass. The center stop is provided throughout its length with three coil springs, which maintain at all times the belt runway in proper relation to the glass, and also the locks, as the racks are attached to the center stop.

At the center header, the glass is weatherproofed by stripping, so arranged that it is at all times in contact with the glass, thus providing a tight joint, whether the window is open or closed. The construction is such that it is impossible for water to pass around the edge of the glass. The glass is insulated against the transfer of heat or cold from the outside to the inside of the car. The model which is being exhibited covers double window construction; however, single windows can be provided with the same general construction.

Two of these windows have been tested for about a year on the Union Pacific and have proved entirely satisfactory. Windows of this type are being applied to 15 modern, 83-ft. passenger coaches being built by the Pullman Car & Manufacturing Company for the Union Pacific.

REPORTS of railroad earnings for May show a mixed trend, about half the roads showing a gain over last year and the other half a loss. Among the roads showing increases are the Reading, the Milwaukee, the Florida East Coast and the Texas & Pacific.

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